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PRACTICALLY NINETEEN MILLIONS.

OUTPUT OF IRON ORE FROM LAKE SUPERIOR MINES DURING 1900—IMPORTANT QUESTION OF SHORTAGE IN STANDARD ORES OF OLD RANGES.

Official reports covering the entire movement of iron ore by lake during 1900 suggest two thoughts of special importance to the iron industry. First it is shown that in the five year period since 1896 the output of the Lake Superior region has been almost doubled; but in the returns from Escanaba, Marquette and Ashland, shipping ports that are outlets for the old range ores, there are decreases of 100,000 to 300,000 tons as compared with last year. The gain is all from the state of Minnesota and almost entirely from the Mesabi, the new range of that state. This means that the fear of a shortage in the valuable ores of the old ranges is not without foundation. In fact it is said by those who are most alarmed regarding this situation that the end is already in sight on the Gogebic range unless some discoveries now unthought of are made very shortly. This may be an extreme statement of the situation, but it is a fact, nevertheless, that this year's experience on the old ranges will have a tendency to stiffen prices on standard ores for another year. The reduction from last winter's high prices will probably not be anything like what was expected. It is understood, of course, that although the new ores of Minnesota may possibly be produced for a long time to come in almost unlimited quantities, it is not possible as yet to use them to advantage in the furnaces without a liberal mixture of the standard products from the old ranges. More will undoubtedly be heard from the ore interests on this score before the Lake Superior product is sold for another year.

As was anticipated early in the summer when a reaction from high prices occurred in the iron industry, the 20,000,000 ton output was not reached. The total shipments, including ore moved by rail, will fall a little short of 19,000,000 gross tons, against 18,251,804 gross tons in 1899. The lake output, with returns complete from all the shipping ports, is 18,570,315 tons, against 17,901,358 tons by lake in 1899. The rail shipments in 1899 amounted to 350,446 tons. Shipments from Nov. 1 to the close of navigation were 1,282,358 tons, against 2,306,898 tons for the same time last year, a falling off of 1,024,540 tons; and still the full output by lake for the year is 668,957 tons greater than in 1899, and therefore greater than in any other year in the history of the industry.

OUTPUT OF IRON ORE FROM ALL MINES OF THE LAKE SUPERIOR ORE REGION
1896 TO 1900 INCLUSIVE—GROSS TONS.

PORTS.	1900	1899	1898	1897	1896
Escanaba.....	3,436,734	3,720,218	2,803,513	2,302,121	2,321,931
Marquette.....	2,661,861	2,733,596	2,245,965	1,945,519	1,564,813
Ashland.....	2,633,687	2,703,447	2,391,088	2,067,637	1,566,236
Two Harbors.....	4,007,294	3,973,733	2,693,246	2,651,465	1,813,992
Gladstone.....	418,854	381,457	335,955	341,014	220,887
Superior.....	1,522,899	878,942	550,403	531,825	167,245
Duluth.....	3,888,986	3,509,965	2,635,262	2,376,064	1,988,932
Total by lake.....	18,570,315	17,901,358	13,655,432	12,215,645	9,644,036
Total by rail.....	.....	350,446	369,241	253,993	290,792
Total shipments....	.....	18,251,804	14,024,673	12,469,638	9,934,828

The gains and losses for 1900 at the several shipping ports as compared with 1899 indicate at Escanaba, Marquette and Ashland the decrease of old range output, and at Duluth, Superior and Two Harbors increase of Mesabi output, as follows:

	Decrease, tons.	Increase, tons.
Escanaba	283,484	.....
Marquette	71,735	.....
Ashland	69,760	.....
Two Harbors .....	.....	33,561
Gladstone .....	.....	37,397
Superior .....	.....	643,957
Duluth .....	.....	379,021
Total	424,979	1,093,936
Excess of increase	668,957	.....
	1,093,936	1,093,936

The next issue of the Review will show how much of the Lake Superior product is still on dock at Lake Erie ports.

A TRAGEDY OF NATURE.

Truth is stranger than fiction. The tragedies of nature defeat the imagination. One reads of tales of horror which are feats of the mind, but they frequently lack the heartlessness and devilish cunning of nature itself. For striking originality and primal barbarity, which has no note of pity in it, one must go to the elements. There is no story of the lakes so pitiless as the one which came this week from Squaw island in Lake Michigan. This little island marks a dangerous and rebellious bit of water and a light-house has been stationed upon it. The province of the light-house keeper and his assistants is to keep this light burning during the season of navigation and to extinguish it during its close. Their business is to stay upon the patch of rock until the last boats have passed for the winter. They did that—the last boats passed on Friday—and they had orders from the naval officer in charge of the light-house district to close the light-house for the winter.

On Friday morning William Shields and William McCauley, the light-house keepers, Mrs. Shields and her niece, Mary Davis, and Lucien

Morden, helper, started for the mainland, seven miles away, in a yawl. They hoisted their little sail and were fairly well out into the sea when a heavy wind struck the boat suddenly and capsized it, throwing all five into the water. The water was icy cold and it was only after a desperate struggle that Shields and McCauley reached the overturned boat and managed to drag the women upon it. With infinite pains they lashed the women to the yawl and then made themselves fast. Morden, who was clinging to the craft, had become delirious with the cold and refused to be bound. Presently he loosed his hold and sank. The four, frozen and helpless, went where the elements directed. There was no hope of rescue. The lake fleet had sought winter quarters. Probably there was not a ship afloat in that part of Lake Michigan. All Friday morning and Friday afternoon they tossed about hoping that a favorable wind would drive their boat shoreward. As evening came on Mrs. Shields died. Night settled down upon the helpless living and the dead that was with them. All night long they were tossed from wave to wave, being submerged part of the time and being constantly drenched with the spray that froze as it fell. When morning broke it was seen that Mary Davis had died during the night. The two living and the two dead were carried shoreward by the wind; and the men were in momentary expectation of being beached when the caprice of the elements drove them back to the sea again. They were buffeted about all Saturday morning, and with hope abandoned grimly waited for death. What hours of agony these men spent is past all reckoning. Their longing was to join the dead women lashed by their sides. At 1 o'clock on Saturday afternoon the steamer Manhattan, making a belated trip to Manitowoc, espied an overturned boat floating in the lake and steamed out to it. They picked up its freight of the quick and the dead. The men were barely alive, but under the influence of stimulants were sufficiently revived to tell their story. It is probable that their limbs will have to be amputated.

REPORTS FROM SHIP YARDS OF THE GREAT LAKES.

Capt. James Davidson of West Bay City has sold two of the wooden steamers built recently at his ship yard to Sayers & Hoyt, vessel owners of San Francisco. One of the vessels is the Bermuda and the other is the steamer built at the Davidson yard during the past summer, but which was not finished in time to go into lake service. She has not yet been named. Both these steamers will take partial loads of grain or flour from Chicago in the spring for Montreal. Then they will take lumber to New York, and from New York they will load general merchandise for San Francisco. The vessel that has not yet been in commission is of full Canadian canal dimensions and will therefore carry about 3,000 net tons on deep draught. She has triple expansion engines, modern steam auxiliary machinery, electric light plant, etc., and it is understood that her new owners are planning on having her engage in transpacific trade. The Bermuda is a smaller vessel and has only compound engines. She will engage in Pacific coasting trade. S. F. Hodge & Co. of Detroit are to install surface condensers and otherwise fit the two steamers for their departure to salt water in the spring. Capt. Davidson says he has not yet made up his mind as to what he will do regarding the construction of wooden vessels at his West Bay City yard during the winter. He is not enthusiastic over the outlook for another year or two. "I notice," he says, "that although the consolidated ship yards are full of vessels under construction for next year, none of them are for the big industrial organizations that have iron ore to move. They are all for the individual owners who control no ore. Probably it would be as well for some of us to go slow for awhile."

A very important order for new vessels, just closed by Gen. Mngr. James Wallace of the American Ship Building Co., brings the number of steel ships under way in the different works of that company up to thirty. This latest order is from Mr. Frank H. Peavey of the Peavey grain elevator interests of Duluth, and is for four steel freight steamers, to cost nearly \$1,500,000. The vessels will be duplicates and similar in nearly all respects to the Minnesota line steamer Mataafa, which was originally owned by Mr. A. B. Wolvin of Duluth and first named Pennsylvania. Dimensions of the new vessels will be 450 ft. over all, 430 ft. keel, 50 ft. beam and 28½ ft. deep. They will have quadruple expansion engines and steam will be furnished by Babcock & Wilcox water tube boilers. Two of them will come out next September and the other two will be ready for sea the following month.

The steamer Neptune, first of the fleet of six steamers being built by the American Ship Building Co. for the Globe Steamship Co., J. C. Gilchrist of Cleveland, manager, was launched at the consolidated companies' Lorain yard on Saturday. The next vessel to be launched there will be the Saturn, building on the south berth of the ship yard for the same company. The keel of the Venus will be laid at once in the berth just vacated. The Neptune is 366 ft. over all, 346 ft. keel, 48 ft. beam, and 28 ft. deep. She will be fitted with triple expansion engines and steam will be furnished by Scotch boilers, 13 ft. in diameter and 12 ft. long. Two freight steamers in addition to the six just referred to are also being built by the American company for another corporation, in which Mr. Gilchrist is managing owner. The vessels are all of about the same dimensions.

Mr. Robert Wallace, Jr., who is in charge of the American Ship Building Co.'s West Bay City yard, is making arrangements to launch during Christmas week one of the two steel tow barges building there for D. R. Hanna and others of Cleveland. The second barge will not be launched for several weeks. These vessels are each 310 by 40 by 24 ft. Two steel freight steamers for J. C. Gilchrist and others of Cleveland will be put down on berths vacated by these barges.

It is reported that the Jenks Ship Building Co. of Port Huron has just secured a contract for a steel steamer (a lumber carrier), making three steel steamers which they now have under order.

SUMMARY OF WORK AT NEWPORT NEWS.

IT IS REPORTED THAT THE SHIP BUILDING WORKS AT THAT POINT HAS RECEIVED CONTRACTS FOR ONE OF THE NEW BATTLESHIPS AND TWO OF THE ARMORED CRUISERS—A REVIEW OF THE YEAR.

The Daily Press of Newport News evidently takes it for granted that the Newport News Ship Building & Dry Dock Co. is to receive contracts for one battleship and two armored cruisers in the apportionment of government contracts, for it publishes an extensive article upon the progress of work at the plant in which these three vessels are credited to it. The Review is not informed that the contracts have as yet been distributed, but the principals of the Newport News works may possibly have assurances that admit of this claim being made. The article in question contains so much that is of interest that the Review presents a very large part of it in the following paragraphs:

With twelve contracts aggregating 130,000 tons displacement and \$24,000,000 in cost, the Newport News company will begin the new year with the brightest outlook in its short but eventful history. No other ship yard in the country has as much tonnage under contract and when one considers that the enormous cost is divided only between twelve vessels, the great size of these ships will be better appreciated. It is doubtful if any American ship yard ever had \$24,000,000 worth of contracts on hand at one time and this work is by no means the capacity of the

tion; W. C. Foley, assistant superintendent of hull construction; James Rowbottom, superintendent of machinery department; Charles F. Bailey, chief engineer; S. L. Wood, assistant engineer; F. P. Palen, chief draftsman, engine drawing room; William Gatewood, chief draftsman, government work, hull drawing room; William Stevenson, chief draftsman, merchant work, hull drawing room; O. P. Loomis, electrical engineer; Alexander Wills, chief of scientific department; George Y. Alsop, civil engineer; John G. Livezey, local auditor; Frank Lee, cashier; DeWitt Crane, material agent; Fred. J. Gauntlett, chief of cost department; L. F. Boggs, private secretary to the general superintendent; John Lowery, general foreman, joiner department; Robert Schofield, foreman boiler shop; J. D. Hay, foreman painter; James Wilkie, foreman blacksmith shop; John Greensmith, foreman machine shop; A. W. Gildner, foreman pattern shop; Charles Brown, foreman ship rigger; William F. Penn, foreman ship carpenter; E. Bachman, foreman outside machinists; James F. Doherty, foreman copper shop; R. L. Davis, lumber inspector; Frank Henefer, foreman mold loft; A. Shankland, foreman of riveters; M. J. West, dock master; W. T. Hopkins, chief engineer, power house; W. P. Wheatcroft, foreman shipfitters; J. F. Hughes, foreman of ship shed; C. H. Richardson, foreman electrician; William McCullum, foreman plumber and pipefitter; Charles White, foreman anglesmith shop; George W. Butler, foreman outside machine shop; J. H. Greves, foreman repair department; F. W. Lindgren, foreman machine shop gallery; Harry Seidler, foreman boat yard laborers; John Thomas, foreman rigger;



MICHIPICOTEN HARBOR, LAKE SUPERIOR, WHERE FRANCIS J. CLERGUE OF SAULT STE. MARIE, ONT., HAS BUILT DOCKS FOR THE SHIPMENT OF IRON ORE FROM CANADA'S NEW MINING DISTRICT.

enormous plant which has been the chief factor in the development of Newport News. The award to this ship yard of two armored cruisers and one battleship by the United States government will mean an increase in the force of men employed at the mammoth plant, and next year will see the greatest ship building activity in Newport News that has been known here since the plant started operations in 1891.

WILL EMPLOY MORE MEN.

Vessels aggregating full 50,000 tons, war and merchant ships, will be launched at these works within the year that will end on June 30 next. About 6,500 men are on the pay rolls, and of this number 300 are employed in putting finishing touches on the \$1,000,000 dry dock. This force is the largest ever worked in the yard at one time. Steadily for months new men have been taken on and every day the force is being increased. The new warship contracts and the necessity for rushing work on the other naval and merchant vessels, in various stages of completion, will require even a larger number of skilled men, and it is confidently expected that the close of the year 1901 will see 8,000 on the pay rolls of the company. The opening of the new dry dock about March 1 will necessitate the employment of many more men, as the ship yard officials are already assured of plenty of repair work to keep both the old and new docks pretty busy.

A LARGE FORCE OF SKILLED MEN.

The following list of superintendents, heads of departments, foremen, etc., will tend to show the scope of this very large establishment: Walter A. Post, general superintendent; A. L. Hopkins, assistant to the general superintendent; M. V. D. Doughty, superintendent of hull construc-

tion; James Williams, foreman common laborers; F. W. Harris, foreman of teams; R. S. Williams, chief watchman.

Among officers of the United States navy on duty at these works are Commander Richard Inch, senior inspector of machinery; Lieut. James Pickerell, chief engineer of battleship Illinois; Naval Constructor Robert Stocker, superintending constructor; Naval Constructor George H. Rock, assistant superintending constructor; Lieut. L. A. Kaiser, inspector of equipment; Acting Gunner John Kenyon, assistant to the inspector of equipment; Chief Boatswain J. B. Aiken, assistant to the inspector of equipment; Lieut. J. G. Quimby, inspector of ordnance; Gunner Frank L. Hoagland, assistant to the inspector of ordnance.

OPERATIONS OF THE PAST YEAR.

During the past year the Cromwell line steamships Comus and Proteus have been turned over to their owners, the last of the four steamships on the second order from the Morgan line went into service and the speedy and formidable battleships Kearsarge and Kentucky were commissioned and accepted by the United States government. The first ships built by this yard for the Morgan line were turned out in the early 90's. During the Spanish war these ships were secured by the government as auxiliary cruisers and the Morgan line placed its second order for four more big steamships. These are now in service, bearing the names of the old vessels, El Norte, El Rio, El Sud and El Cid. Today the yard has contracts for four more ships for the same line and three of them are now on the ways.

During the year material progress has been made on the battleships Illinois and Missouri and the monitor Arkansas. Keels were laid for the two large Pacific Mail steamers Siberia and Korea, and keels were also

laid for three Morgan liners, El Alba, El Dia and El Libre. The keel for the fourth, El Siglo, will go down very soon. The monitor Arkansas was launched in November. The battleship Illinois is nearly completed and her trial trip will be an event of the near future. The battleship Missouri is on the ways, about 20 per cent. advanced.

The first of the Pacific Mail liners, which are building for the fast service between San Francisco and ports in Asia, will be launched probably in January. The second ship will follow about a month later. The Morgan liners now on the ways will go overboard in March, April and June, respectively. The Missouri will be launched during the year and keels will be laid for the two new cruisers and new battleship which have just been awarded to the company. One of the most important events of the year, as stated before, will be the opening of the new dry dock.

STILL PLANNING IMPROVEMENTS.

It is probable that costly improvements will be made during the year. In fact improvements are being made all the time and every department is kept thoroughly up to date in its equipment. Two new ship ways and a new electric cantilever crane, with steel trestle, will probably be erected in the north end of the yard, in line with the three cranes and six ship ways now in use. Of course the building of this additional ship building crane depends on the need for it. Should it be found that the contracts now on hand can be filled without the addition of another crane and two ship ways, their construction may be delayed for a time. One of the

rate of 200,000 gallons a minute. That, of course, means that when full the big basin contains 24,000,000 gallons of water. It will be an easy matter to repair in this dock two first-class battleships, placed end to end, at one time, or the largest transatlantic liner ever built or proposed, with room to spare.

The old dry dock is of the following dimensions: Length on top, 610 ft.; width on top, 130 ft.; width on bottom, 50 ft.; width at entrance, 93 ft.; draught of water over sill, 25 ft. The time required to pump the water out of this dock is one hour and thirty minutes.

It is estimated that the works of this company as they stand represent an investment of about \$13,000,000, although Mr. Huntington often said he valued them at far more. He once said he might sell for a trifle less than \$20,000,000.

ACTIVITY AT FORE RIVER ENGINE CO.'S WORKS.

The preliminary decision of the navy department to award one contract and possibly two to the Fore River Engine Co., Weymouth, Mass., has called attention to the growth of industrial enterprises in New England. This company was started in 1884 as a works for the building of pleasure boats. Its first government contracts were for the construction of lightship No. 72 and the twin torpedo boat destroyers Lawrence and Macdonough. The cruiser Des Moines is now well along towards the launching stage. Mr. Frank O. Wellington and Mr. Thomas A.



FRANCIS J. CLERGUE'S IRON ORE MINE NEAR MICHIPICOTEN.

trestles was recently removed, taking with it the crane and ship ways, to make room for the new dry dock, and there are now three of these cranes in operation, two with steel trestles and one with wooden trestle, all operated by electricity. This yard was the first in the country to introduce the steam and electric cantilever crane in the ship building industry. Since then other yards have adopted the same plan of conveying material to the parts of a ship where it is needed.

Several important repair jobs have been undertaken by the company of late, including extensive work on the United States transport Buford and the North German Lloyd steamship Main, the latter being at the yard now. The Buford was converted from an ordinary transport into a troopship, the price involved being \$400,000. The cost of the work on the Main will be in the neighborhood of \$600,000. The Main was burned in the big Hoboken fire at New York some months back and was completely wrecked inside. The time allowed for completing the work on this ship is one year.

PARTICULARS OF THE NEW MILLION-DOLLAR DRY DOCK.

All the masonry work on the new dry dock will be finished by Jan. 1. It will take some little time to remove the cofferdam, attach the caisson and get everything in shape for its operation, but the ship yard officials are confident that March 1 will see it ready for use. The cost of this immense basin is placed at \$1,000,000. At times as many as 1,000 men have been employed on the work. Following are its dimensions: Length on top, 827 ft.; length inside the caisson, 806 ft.; breadth on top, 162 ft.; breadth on bottom, 80 ft. The entrance is constructed so as to admit any vessel that can be accommodated inside of the basin. The depth over the sill is 30 ft. The entrance abutments are built of concrete faced with granite and the bottom is concrete over piling. The interior is constructed of timber. The caisson is of steel and will be operated with trimming tanks, so arranged that it will be necessary to pump out the water ballast. The pumping plant will empty the dock in two hours, which is at the

Watson, principal owners of the works, are delighted at their prospect of success.

"We have had no official notification as yet," said Mr. Wellington, "but we are sure of our share of the ship building work for the government. Our bids were all submitted independent of other concerns, and we win out over a combination of many of our competitors. By the first of the year we shall have launched the Macdonough and have moved our works entirely from Weymouth to Quincy Point. Our present force of employes is less than 600, but within eighteen months we shall have in our employ at least 3,500 men, with a total pay roll of \$50,000 a week. Many of these will be skilled mechanics, whose pay averages from \$2.50 to \$3.25 per day."

Mr. Watson, in speaking of the company's plans, said: "There is no reason why a great center of mechanical skill like New England should not have a full share of ship building. The building of government vessels will be in a certain sense a side line with us, as we plan to make as our specialty modern passenger and freight sea-going vessels of a standard grade. The increase of our merchant marine will come to a large extent from New England ship yards. Within two weeks we have had twenty-four requests for figures on vessels, aggregating a cost of \$15,000,000 to \$18,000,000."

Asked as to the possibility of the company's building the cup defender proposed by Thomas W. Lawson, Mr. Wellington said: "No, we shall not attempt it. We could do it, but we should not be willing to be responsible for the building of a successful yacht unless we could have the time fully to 'check' it first in every detail. This would be impossible under the terms and limits required by Mr. Lawson."

A large dredge built for the Atlantic, Gulf & Pacific Dredging Co., at the foot of Fourteenth street, Washington, D. C., was successfully launched a few days ago. The dredge will be used in the improvements contemplated in the harbor.

CARE OF SAULT RIVER AIDS TO NAVIGATION.

Vessel men of the lakes will give all possible assistance to officials of the light-house board in their effort to secure from the present congress an appropriation for a second light-house tender for the eleventh district, the vessel to be used especially on the St. Mary's river. The work of the eleventh district is increasing and has already reached such an extent as to make it difficult for the inspector of the district with one small tender to supply and inspect all the stations and tend the necessary office work. But aside from this it is quite generally agreed that the contract system of caring for buoys is far from satisfactory. The new vessel would take up this work. A suitable craft with a gas-carrying plant could be built for about \$60,000. The full benefit from the new buoy depot on Sugar island in the St. Mary's river will not be secured until such a tender is provided. This depot will always be a convenience for the storage of buoys and appendages, but if stores and supplies for the river and adjoining stations have to be transported from Detroit to this depot by the Mari-gold, the vessel now in service, and from there distributed to the various stations in the river, it would be easier and cheaper to transport them from the buoy depot at Detroit direct to the various stations.

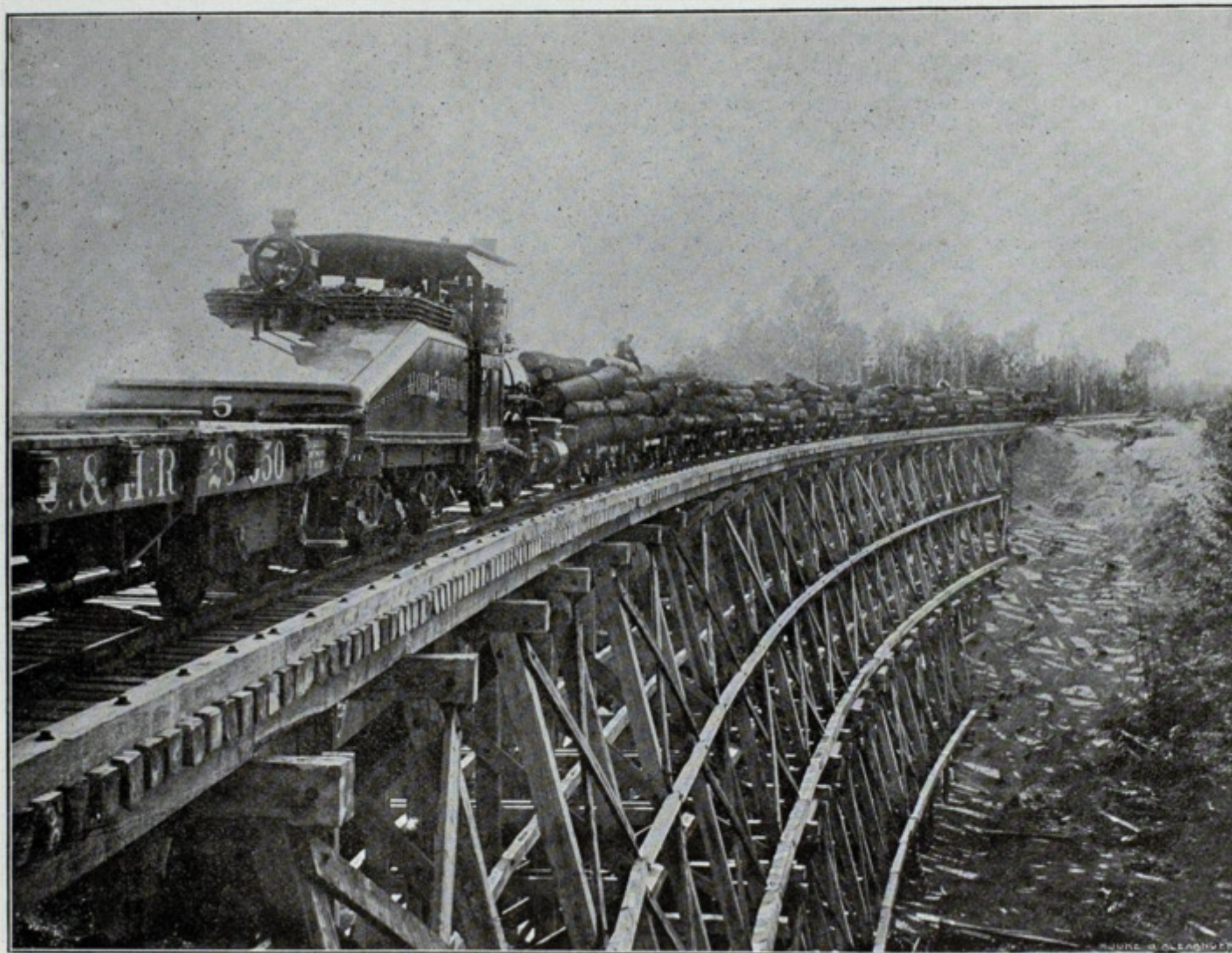
Among duties proposed for the new tender are the following: First, to place all buoys in the river at the opening of and take them up at the close of navigation each year; second, to obtain stores and supplies from the supply depot in Detroit and distribute them to the various stations in and adjoining the St. Mary's river; third, to paint all buoys and inspect

Williams, daughter of Mr. and Mrs. John R. Williams of Chicago. The couple have gone south on their wedding tour. Mr. Clawson, who is popular in the Goodrich line, was presented with a purse of gold by his business associates.

Captain Joseph Munger, master of the Goodrich line steamer Atlanta, died very suddenly of heart failure at Manitowoc last week. He was forty-eight years old and had been with the Goodrich line for several years. The Chicago and Sheboygan were also among Goodrich line steamers which he commanded, and he had previously been in the Francis Hinton and Philatus Sawyer.

About half a million bushels of oats has been stored in lake vessels at Chicago during the past few days, but as yet there is nothing doing in other grains. Corn is not in condition for storage in vessels. Chicago elevators now contain 26,489,000 bushels of grain, divided as follows: Wheat, 17,304,000 bushels; corn, 2,426,000 bushels; oats, 5,768,000 bushels; rye, 643,000 bushels; barley, 348,000 bushels.

Vessel men at Sandusky are asking for the assistance of the Lake Carriers' Association in trying to secure a white flash light at Marblehead station, Lake Erie. One of the Sandusky captains says: "Of late years a great many freighters pass that way. Three strandings occurred during the past season on account of a light on Kelley's island being taken for the Marblehead light." The change is suggested now because of improvements that have been under way at the Marblehead station,



LOG TRAIN ON FRANCIS J. CLERGUE'S NEW ALGOMA CENTRAL RY.

and fill all the gas buoys and care for certain lights now in charge of laborers in the St. Mary's river; fourth, to make a daily patrol of the river and (in case a junior officer could be ordered to the district) to inspect and take charge of all lights, stations and buoy work in the river, the inspector making an annual inspection and such other trips of inspection as he may think desirable.

AROUND THE GREAT LAKES.

Cleveland ship masters will hold their annual reception and ball at the Chamber of Commerce, Friday, Jan. 25.

A correspondent asks for average rates on lumber during the past few years from the head of Lake Superior to Ohio ports. They were as follows: 1900, \$2.33; 1899, \$3.08; 1898, \$1.78; 1897, \$1.58.

Nye, Jenks & Co., who have large grain elevators at Duluth, Washburn and Milwaukee, will build a steel house of 1,000,000 bushels capacity at Chicago, to be operated by a new corporation, to be known as the Rialto Elevator Co.

Cleveland coal shippers are looking for vessels to load coal and hold it during the winter, to be moved up the lakes next spring, but vessel owners are not anxious to enter into an arrangement of this kind on account of the "going rate" feature of the charter, which is usually unsatisfactory to the ship.

Friends of Capt. Fred. Johnson, master of the large steel tug S. M. Fisher, owned by the Lake Michigan Car Ferry Transportation Co., will try to secure for him from congress a gold medal for heroism in saving the lives of fourteen men from two car ferry barges which the Fisher had in tow and which were sunk in a terrific storm on the lake Nov. 13 last.

Mr. Walter P. Clawson, chief electrician of the Goodrich Transportation Co., Chicago, was married on the 17th inst. to Miss Cora Sinclair

but it would seem that the suggestion comes too late, as the improvements have been completed and it is officially announced that a fixed white light of the fourth order has been established at the station.

STEEL FORGINGS FOR MARINE ENGINE USE.

The Bethlehem Steel Co.'s "campaign of education" for the elevation of the standard of steel forgings for marine engine use is slowly but surely making its impression on the vessel owners of the great lakes, as is evidenced by a recent order placed with this company by the owners of the side-wheel passenger steamer Pennsylvania. When laying up this vessel recently, it was discovered that the paddle-shaft was cracked, and the owners decided to replace the shaft by one of fluid-compressed, open-hearth steel, hydraulic-forged and annealed, to insure themselves against possible disaster in the future.

It will be remembered that the Bessemer Steamship Co. has used hollow-forged, oil-tempered shafts, of this company's make in all their recently-built steamers, and several other prominent vessel owners have specified hydraulic-forged, open-hearth steel shafts for their vessels.

The Eastern Ship Building Co. has announced that the contract for the engines of the two mammoth steamships building by the company at New London, Conn., for service on the Pacific in connection with the Great Northern Ry., has been awarded to the Midvale Steel Co. The plans are prepared in the draughting room of the ship building company. Each ship will be equipped with two engines—triple expansion, directing acting, with cylinders of 29, 52 and 91 in. diameter, intended to develop 10,000 I.H.P. each.

Capt. F. W. Dickens has sailed for the Asiatic station to take command of the Oregon.

MERCHANT SHIPS OF THE UNITED STATES.

WHERE THEY ARE BUILT AND OWNED—THE LAKE FLEET OF VESSELS AVERAGING 2,000 TONS IS STILL GREATER THAN THE NUMBER OF CRAFT OF LIKE TONNAGE IN ALL OTHER PARTS OF THE COUNTRY—INTERESTING SUMMARIES FROM THE REPORT OF THE COMMISSIONER OF NAVIGATION.

It would be a great pleasure to announce in these columns when the government statistics of ship building are presented each year that the increase on the seaboard was keeping pace with the steady growth in the fleet of steam vessels on the lakes, but unfortunately such is not the case, even in the coastwise trade of the seaboard.

On the great lakes there are now 424 steam vessels having a tonnage (gross register) of 1,000 tons or more. The aggregate tonnage of these vessels is 911,533, so that the average is 2,150 tons. In all other parts of the United States combined the number of such vessels (1,000 tons and over) is 354, the aggregate tonnage 798,603 and the average 2,256. It will therefore be seen that there are more steam vessels of large capacity on the lakes than are to be found in any other parts of the country.

These figures, as well as all others in the following tables, are from the annual report of the United States commissioner of navigation, issued a few days ago, and which deals with the shipping of the United States on June 30, 1900. The tons are in all cases gross register tons. These tables also show that the fleet of steel vessels on the great lakes is fast assuming large proportions. There are 763 steel vessels (steam and sail) owned on the Atlantic coast, as against 322 on the great lakes, but the aggregate tonnage of the coast vessels is only 762,821 against 687,769 on the great lakes. The average tonnage of the lake steel ship, therefore, is 2,136, against only 999 for the Atlantic coast steel ship. On the Pacific coast there are only eighty-four steel vessels of 125,382 tons and on the western rivers only fifty-one of 11,401 tons.

STATEMENT SHOWING THE NUMBER AND TONNAGE OF VESSELS OF ALL KINDS OWNED IN THE UNITED STATES ON JUNE 30, 1900.

Districts.	Number of vessels.	Gross tonnage.
Atlantic and Gulf coasts.....	16,532	2,727,892
Pacific coast.....	2,203	601,212
Hawaiian islands.....	14	11,692
Northern lakes.....	3,167	1,565,587
Western rivers.....	1,417	258,456

Grand total..... 23,333 5,164,839

Sailing vessels.....	13,271	1,884,842
Steam vessels.....	7,053	2,657,797
Canal boats.....	647	73,383
Barges.....	2,362	548,817

Grand total..... 23,333 5,164,839

STATEMENT SHOWING NUMBER AND TONNAGE OF STEAM VESSELS OF 1,000 TONS AND OVER OWNED IN THE UNITED STATES ON JUNE 30, 1900.

Districts.	Number of vessels.	Gross tonnage.
Atlantic and Gulf coasts.....	273	640,152
Pacific coast.....	71	143,691
Hawaiian islands.....	.....	.....
Northern lakes.....	424	911,533
Western rivers.....	10	14,760

Total..... 778 1,710,136

STATEMENT SHOWING NUMBER AND TONNAGE OF VESSELS OF ALL KINDS OWNED IN THE UNITED STATES ON JUNE 30 OF EACH YEAR FOR TEN YEARS PAST.

JUNE 30.	*SAIL.		STEAM.		TOTAL.	
	Number.	Gross tonnage.	Number.	Gross tonnage.	Number.	Gross tonnage.
1891	17,683	2,668,495	6,216	2,016,264	23,899	4,684,759
1892	17,991	2,690,504	6,392	2,074,417	24,383	4,764,921
1893	17,951	2,641,799	6,561	2,183,272	24,512	4,825,071
1894	17,060	2,494,599	6,526	2,189,430	23,586	4,684,029
1895	16,686	2,423,159	6,554	2,212,801	23,240	4,635,960
1896	16,313	2,396,672	6,595	2,307,208	22,908	4,703,880
1897	16,934	2,410,443	6,599	2,358,578	22,633	4,769,020
1898	15,993	2,377,815	6,712	2,371,923	22,705	4,749,738
1899	15,891	2,388,227	6,837	2,476,011	22,728	4,864,238
1900	16,280	2,507,042	7,053	2,657,797	23,333	5,164,839

*Includes unrigged craft.

STATEMENT SHOWING GROSS TONNAGE OF VESSELS OF ALL KINDS BUILT IN THE UNITED STATES DURING TEN YEARS PAST.

Year ending June 30.	On the Great Lakes.	On the New England coast.	On the entire seaboard, including New England coast.	On the Mississippi River and its tributaries.	Total.
1891	111,856	105,491	237,462	19,984	369,302
1892	45,969	60,624	138,863	14,801	199,633
1893	99,271	37,091	102,830	9,538	211,639
1894	41,985	28,665	80,099	9,111	131,195
1895	36,353	26,783	67,127	8,122	111,602
1896	108,782	39,582	102,544	15,771	227,097
1897	116,937	21,942	103,504	11,792	232,233
1898	54,084	23,944	112,879	13,495	180,458
1899	80,366	68,761	196,120	23,552	300,038
1900	130,611	72,179	249,006	14,173	393,790

STATEMENT SHOWING THE CLASS, NUMBER AND TONNAGE OF IRON AND STEEL VESSELS OWNED IN THE UNITED STATES ON JUNE 30, 1900.

Districts.	*Sail.		Steam.		Total.	
	No.	Gross tonnage.	No.	Gross tonnage.	No.	Gross tonnage.
Atlantic and gulf coasts	51	54,890	712	707,931	763	762,821
Pacific coasts.....	13	15,275	71	110,107	84	125,382
Hawaiian islands.....	5	5,458	.....	.....	5	5,458
Northern lakes.....	72	141,223	250	546,546	322	687,769
Western rivers.....	...	.....	51	11,401	51	11,401
Grand total.....	141	216,846	1,084	1,375,985	1,225	1,592,831

*Includes barges.

CONTRACTS FOR THE ELEVEN NEW WARSHIPS.

As matters now stand contracts for building the eleven warships, provided for by recent acts of congress, will be awarded by the navy department as follows: One battleship and two armored cruisers each to the Cramps of Philadelphia, the Newport News company of Newport News, Va., and the Union Iron Works of San Francisco; a battleship to the Fore River Engine Co., Weymouth, Mass.; and a battleship to the Bath Iron Works, Bath, Me. There is a possibility, however, that the Bath company may not get an award. Contracts for one unsheathed cruiser each have been definitely given to the Cramps, the Newport News company, and the Union Iron Works.

Naval Constructor Baxter, who inspected the Fore River Engine Co.'s works, and Naval Constructor Hibbs, who inspected the Moran Bros. Co.'s works, reported that these firms could build armorclads within the specified time if they made certain improvements. Mr. Baxter said that the Fore River company was abundantly able financially and would have the constructive capacity and facilities as the work progressed to construct a battleship, and Mr. Hibbs reported that the Moran Bros. Co. needed more tools, which could be obtained, however, in time to enable them to complete armorclads within the limit of the contract.

The Bath Iron Works may secure one vessel if it changes its bid, which, while \$50,000 below the limit of the appropriation, eliminated certain work that will cost \$180,000 according to the board's estimate. The best bid of the Moran Bros. Co. was regarded by the board as too high, but there is a chance that the secretary may exercise his authority to allow them to scale their bid so as to obtain one of the three vessels to be built on the Pacific coast.

RECORD BREAKING SEASON—NEW BOATS.

The Richelieu & Ontario Navigation Co., operating freight and passenger steamers on the St. Lawrence river and Lake Ontario, has just closed a most successful season and a record breaker as far as passengers are concerned. The company has decided to put on the Lake Ontario route another new steamer after the type of the Fall River boats, with modern improvements. The new steamer, for which the contract has been given to the Bertram Engine Works Co. of Toronto, is to be 340 ft. long—that is, 62 ft. longer than the new steamer Toronto and 50 ft. longer than the steamers Kingston and Quebec. The width will be 42 ft. in hull and 73 ft. over the guards; depth of hull, 15 ft. The name of this new steamer is not definitely decided, but it will in all probability be called the Montreal; the present boat of that name to be renamed. There will be over 266 staterooms, including twenty-two parlor rooms and eight bath rooms. The contract calls for a style of finish unsurpassed by anything afloat. The saloon will be built with two tiers of staterooms, and so arranged that a third tier can be added subsequently, which would give one-half more sleeping accommodation. The dining room will be on main deck aft. There will be accommodation for second-class passengers on main deck forward, which will have a large number of sleeping berths. The engine is to be inclined, triple expansion, having three cylinders and three cranks, and of 3,000 I.H.P., with feathering paddle wheels and curved steel buckets. The consumption of coal is not to exceed 1.68 lbs. per indicated horse power per hour. There will be six single ended Scotch boilers, each 11 ft. diameter and 11 ft. 6 in. long, with Howden hot draft. The regular service speed is to be 17 miles per hour, with ability to make 19 miles when required. The engine is of the same style as that of the steamer Toronto, but will have half more power than the Toronto's engine, and a speed of three more miles an hour than that of the present Quebec steamers—one of which this new steamer is to replace. Contract calls for completion of boat in the spring of 1902. Next season the new steamer Kingston, with the Toronto, will form the line between Toronto and Prescott, and the steamers Bohemian and Columbian will receive the passengers at Prescott and take them to Montreal. The Columbian is now being prepared with completely new upper saloon, dining room and all other necessary rearrangement for that service. The Quebec and Saguenay line will be the same as in past season, but the following year (1902) when the new Montreal is on the Montreal and Quebec route, the present steamer Montreal will be changed into a pilgrimage boat, with complete new passenger accommodation, giving her a passenger capacity double that of the present pilgrimage steamer Three Rivers. The Hamilton line is to be still further improved the coming year, the Spartan running with the Hamilton and Algerian, thus giving a direct tri-weekly service between Montreal and Hamilton, and being one steamer more than in the past season.

Boilers of the new 18-knot Ward line steamship Morro Castle, having 442 sq. ft. of grate surface, are equipped for forced draft, furnished by four special Sturtevant fans, having wheels of 66 in. diameter, driven by direct-connected, double-enclosed engines, designed to run at 480 revolutions per minute.

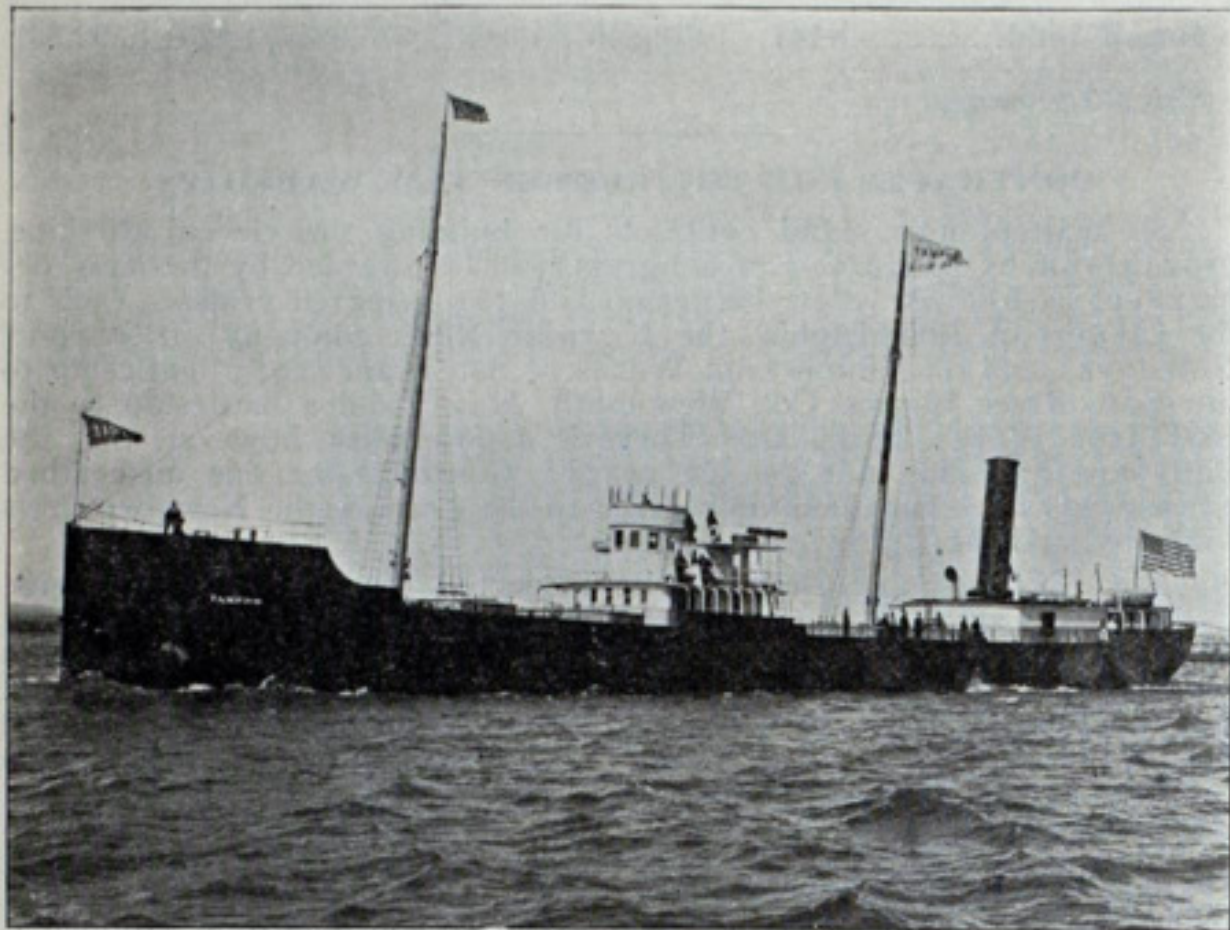
After several months of curtailment, the production of pig iron is again increasing, and it is encouraging to note that at the same time stocks are declining.

DEVELOPMENT OF THE CRAIG WORKS.

NUMEROUS IMPROVEMENTS HAVE BEEN MADE IN THE TOLEDO YARDS AND CONTRACTS ARE NOW IN HAND FOR THE CONSTRUCTION OF SEVEN NEW STEAMERS.

(Special Correspondence to the Marine Review)

Toledo, O., Dec. 18.—The Craig Ship Building Co., which, with the Jenks Ship Building Co. of Port Huron, is the only lake ship building concern of importance not controlled by the American Ship Building Co., is enjoying a season of unusual prosperity, having contracts on hand for the construction of seven steamers. The company at present employs 450 workmen, but intends to increase its force to 1,000 men within six



The full canal size steamer Tampico, No. 80, building at the Craig Ship Building Co.'s yard, Toledo, is a duplicate of her.

weeks. The plant is now excellently adapted to very large increase, both of men and material. During the past year numerous changes have taken place at these works, which embrace twenty-three acres of ground. The buildings have been rearranged to facilitate the handling of material, to provide, in fact, for an economy of work in construction. This is well illustrated in the location of the new ship building tool shop. Formerly it was located across the face of the ground from where the vessels were

appliance. The works are thoroughly up to date in compressed air tools—such as riveting, drilling, chipping and caulking appliances. The electric cranes over the two large building berths are so arranged that one of them extends over the railroad tracks so that the material is removed direct from the cars to its respective shop. The yard is interlaced with railway tracks, extending to every shop, so that the utmost economy in handling obtains. Following is a description of the vessels now under order at this company's works:

Builders' No. 80 for the Hawgood Transportation Co. of Cleveland, is a duplicate of the Tampico, which was recently taken to the coast. The vessel is of full canal size, 260 ft. over all, 43 ft. beam and 26½ ft. depth of hold. Like the Tampico she is to be fitted out for salt water. The vessel will be equipped with a single triple expansion engine with cylinders of 20, 32½, 55 in. diameter, and a stroke of 40 in.; two Scotch boilers, 12½ by 12 ft., designed for a pressure of 180 lbs. Her I.H.P. is 1,000 and she is designed for a speed of 12 miles. She is to be constructed of steel throughout and is to be ready about April. At present she is about 40 per cent. completed. She will cost \$175,000.

Builders' No. 81 for the Booth Packing Co. of Chicago is to be a vessel 185 ft. long over all, 31 ft. beam, 12½ ft. to the lower hold and 8 ft. between decks. She will have a full cabin and will be fitted with passenger accommodations upon the upper deck. She is designed to run on the north shore of Lake Superior in the passenger and freight business with particular reference to the fishing trade. Her engine is a triple expansion with cylinders of 15, 25, 42 in. diameter and 24 in. stroke. Steam will be generated by two Roberts No. 4 water tube boilers designed for a pressure of 200 lbs. Her I.H.P. is 750 and her estimated speed is 16 miles. She is to be constructed of steel throughout and is to cost, complete, \$100,000. She is about 20 per cent. completed and is promised for April.

Builders' No. 82 for the Holland & Chicago Transportation Co. is to be 240 ft. over all, 40 ft. beam, 16 ft. to the lower hold and 8 ft. between decks. She will be equipped with a full cabin of staterooms on the upper deck, and will have the pilot house, officers' room and social hall on the hurricane deck. Her cabins will be finished in hard wood and it is designed to make her in furnishings the equal of any craft afloat on the lakes. She will ply between Holland and ports on the east shore of Lake Michigan in the freight and passenger business. Her engines are triple expansion, with cylinders of 21, 35 and 38 in. diameter and 40 in. stroke. Steam will be supplied by four Roberts water tube boilers. The I.H.P. is 1,500 and the estimated speed 18 miles an hour. The steamer is about 10 per cent. completed now; she is promised for May 1, and will cost, complete, \$180,000.

Builders' No. 83 is to be a duplicate of the Chippewa, which was built for the Arnold Transportation Co. of Mackinaw, Mich., last year, and is for the same company. The distinguishing difference is that the new vessel will be 16 ft. longer and 1 ft. deeper than the Chippewa. Her dimensions are 216 ft. long, 34 ft. beam, 12 ft. to lower hold, 8 ft. between decks. Her engines will be triple expansion, with cylinders of 21, 35, 58 in., and a stroke of 30 in. She will be equipped with four Roberts water tube boilers and is designed to maintain a continuous speed of 18 miles

PARTICULARS OF SEVEN STEEL STEAMERS BUILDING AT THE WORKS OF THE CRAIG SHIP BUILDING CO., TOLEDO.

Builders' number.	Type.	Over all.	Beam.	Depth.	Cost.	Engines.	Boilers.	I. H. P.	Speed in miles.	Building for.
80	Full canal size steamer	260	43	26½	\$175,000	Triple expansion, 20", 32½", 55"x40".	Two Scotch, 12½"x12'	1,000	12	Hawgood Trans. Co.
81	Passenger and freight steamer	185	31	12½	100,000	Triple expansion, 15", 25", 42"x24".	Two Roberts water tube.	750	16	Booth Packing Co.
82	Passenger and freight steamer	240	40	16	180,000	Triple expansion, 21", 35", 38"x40".	Four Roberts water tube.	1,500	18	Holland & Chicago Trans. Co.
83	Passenger steamer	216	34	12	165,000	Triple expansion, 21", 35", 58"x30".	Four Roberts water tube.	1,250	18	Arnold Transportation Co.
84	Day passenger steamer	130	12	8	60,000	Fore-and-aft comp., 20", 42"x24".	Two Roberts water tube.	650	15	Sandusky & Island Stbt. Co.
85 and 86	Pass. and fruit strs. (duplicates)	260	38	25	200,000	Triple expansion, 21", 35", 58"x40".	Three Scotch, 11"x11'.	1,500	16	F. W. Wheeler, chartered to United Fruit Co.

put down. It can readily be seen how many needless steps were taken in going from the stern of the vessel to the shop to lay out a piece of work. If the workman felt that his measurements were uncertain after he had reached the shop he would have to walk the whole length of the vessel back again in order to verify them. In order to remedy this waste of effort the company decided to erect the tool shop between the two building berths. The new shop is substantially constructed and is 350 ft. long and 50 ft. wide, giving room for a ship 55 ft. wide on each side of the shop, the materials being handled by traveling cranes. Vessels on one side of the shop are launched into the drydock, which is now undergoing extension to a length of 540 ft. On the other side the vessels are launched into the slip. Adjoining the slip on the side opposite from the tool shop is room for two additional building berths which are being occupied by the present rush of work. Vessels built upon these berths are launched both right and left—one into the tool shop slip and the other into the second slip which marks the western extremity of the yard. When the dry dock extension is completed, which will be in the immediate future, it will provide launching room for another building berth. The company will build the Sandusky & Island Steamboat Co.'s new boat upon this berth.

The old tool shop has been moved to the boundary line of the yard and converted into a large joiner shop and mold loft and model making room. The furnace slabs are in a building 250 ft. long and 40 ft. wide, which is also used as a storehouse. The company has also erected a large brick machine shop, 250 ft. long and 70 ft. wide, in which are installed the latest tools consisting of lathes, planers, drills and complete pipe fitting machinery. Some fine marine engines have already been built and four have been commenced on present contracts.

The plant is equipped with all the latest improvements, including electric cranes and a complete electric lighting plant, so that, if necessary, it could work double time. The Craig Foundry Co., although a separate corporation, is controlled by the Craig Ship Building Co., and conducts a thoroughly equipped foundry, in which castings of thirty tons weight can be turned out. It has been running since last spring and has proved to be a welcome and much needed addition.

The equipment of ship yard tools represents the latest in mechanical

upon 1,250 I.H.P. She will enter the passenger service between Cheboygan, Mackinac island and Sault Ste. Marie. Her cabins are to be finished in mahogany and she is to be furnished with all appointments for first-class passenger service. The blocks have been laid for her keel and the material for her construction is now being assembled in the yard. She will cost, when complete, \$165,000 and is promised for June 15.

Builders' No. 84 for the Sandusky & Island Steamboat Co. is to be of 130 ft. keel, 28 ft. beam, 12 ft. deep, 8 ft. between decks. She will be equipped with a fore-and-aft compound engine, with cylinders of 20 and 42 in. diameter, and a stroke of 24 in. Steam will be supplied by two Roberts water tube boilers, 9 by 9 ft. Pumps are independent. She is expected to make a speed of 15 miles upon 650 I.H.P. As she is to be run as a day boat her cabin will have only a few staterooms in it. She will be finished throughout in hard woods. The vessel will cost, complete, \$60,000. Her keel has not yet been laid down, but she is promised for June 15.

Builders' Nos. 85 and 86 are to be duplicates, built upon the order of Mr. F. W. Wheeler, and to be chartered and used in the coast trade by the United Fruit Co., Boston. These vessels will be 260 ft. over all, 38 ft. beam, 25 ft. molded depth. They will each have two full steel decks. An orlop deck will be laid in the lower hold upon which to carry fruit. There will be a house on the spar deck, 80 ft. long for officers, dining room and kitchen; and a cabin upon the deck of this house, with accommodations for thirty passengers. Engines will be triple expansion, with cylinders of 21, 35 and 58 in. diameter, and 40 in. stroke. Steam will be supplied by three Scotch boilers, 11 by 11 ft., designed to carry a pressure of 180 lbs. The vessels are designed for a speed of 16 miles upon an I.H.P. of 1,500. One of the vessels will be laid down in January and the other in March, to be completed in August. Each vessel will cost, when complete, \$200,000.

The company has on hand at present an unusual amount of repair work. Among the larger class of repair work are the schooners Melvina and C. Spademan, which were blown into Sandusky bay during a recent storm. They are forlorn looking specimens and present a sad case of dilapidation. Had it not been for the buoyancy of their cargoes of hemlock they would probably have foundered.

BREAK IN A LARGE NEW GRAIN ELEVATOR.

(Special Correspondence to the Marine Review.)

Duluth, Minn., Dec. 18.—The great Peavey concrete elevator at Duluth, planned to be one of the finest at the head of the lakes, was tested a few days ago by the placing of 50,000 bushels of wheat in one of the interior concave bins. The bin broke almost at once, as shown in the illustration. The break is a very serious one, as can be seen, and casts doubts on the style of construction adopted in this house, the first of its kind in the United States and the largest structure in the world.

The elevator is a series of circular bins, each rising 104 ft. in the air, set on a wonderfully solid foundation of piling and concrete. These circular bins are set in three rows of five bins to the row and are about 3 ft. apart in the rows. There is therefore a space formed by the walls of these bins, connected together at the nearest points, that makes a series of intermediate concave bins, each of which is slightly smaller than the circular bins. These bins are not as strong as the circular ones, because of their shape, and by the further reason that the round bins are strengthened every 8 in. of their height by steel tie bands running completely around the bins and forming a series of hoops. The walls of concrete are from 1 ft. thick at the bottom to 8 in. at the top, and the roof of the structure is of concrete with a steel frame.

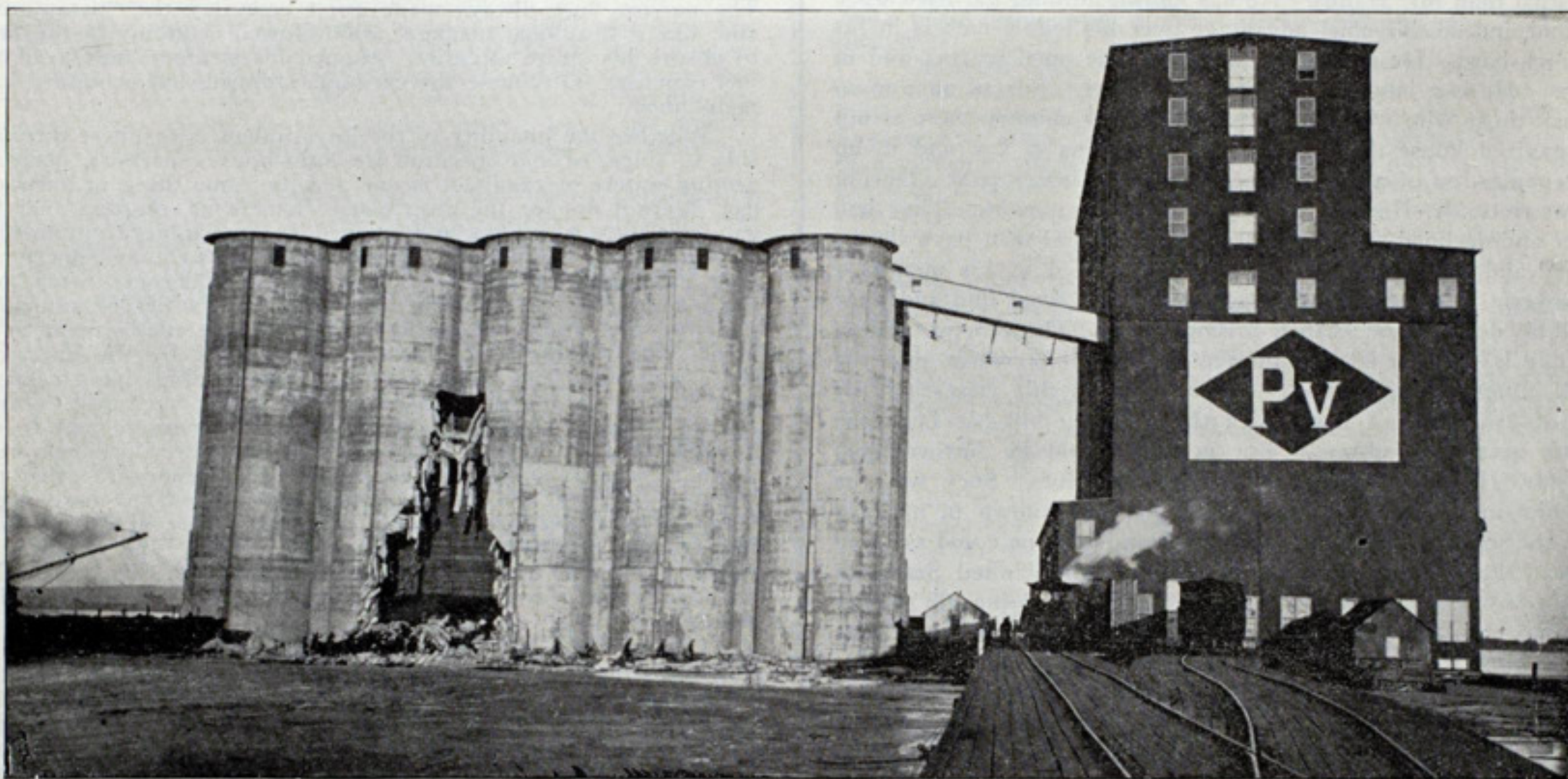
There is nothing to burn in this house, and it has been the plan of Mr. F. H. Peavey, head of the "Pv" grain system, to make it of such a character that no insurance will be needed on certificates of grain stored

FROM THE MARYLAND STEEL CO.'S WORKS.

(Special Correspondence Marine Review.)

Sparrow's Point, Md., Dec. 18.—The preliminary builders' trial of the dredging steamer Thomas, building for the Metropolitan Dredging Co., by the Maryland Steel Co. (marine department), occurred on Saturday last in Chesapeake bay. The results were most satisfactory in every way. A complete description of the Thomas and her sister ship, the Mills, was recently published in the Review. It will be recalled that these ships were designed to dredge out a 40x2,000 ft. channel, which Mr. Andrew Onderdonk has contracted with the United States government to open from the Narrows in New York harbor across Sandy Hook bar to the open sea. They are the first of their kind to be built in this country and are the largest in the world. They are 300 ft. long between perpendiculars, 52 ft. 6 in. beam and 25 ft. deep, with a hopper capacity of 2,800 cubic yards. The trial showed the Thomas to be a speedy ship, as she made 13½ miles an hour. The propelling machinery ran with a smoothness and freedom from heating which is expected of old engines. The Ellis & Eaves system of induced draft gave complete satisfaction. The low temperature in the fire room is a noticeable effect of this system. Indeed, the difference between the thermometer readings on deck and below was but a few degrees. An average draft in the uptake of 3 in. was maintained. A short test of pumping engines was made, the 48-in. Morris centrifugal pump discharging 80,000 gallons per minute.

The Thomas carries a crew of forty-seven men—Captain, A. B. Conner, formerly superintendent of the Mallory line and later in the army transport service; first mate, Mr. Littlefield; second and third



THE BREAK IN THE CONCAVE BIN.

therein. The house was inspected by bankers the day before grain was put into it and they agreed to loan money on certificates without the formality of insurance. The break may possibly change all this for a time, and great caution will be followed by banks and others until it is seen that the break is the result of a local cause that should not have occurred and that will not happen again.

It is probable that this calamity, for such it is to the grain trade and the owners of the house who had pinned their faith to its success, is the result of too much haste to fill the house. Construction on the superstructure began last August and was carried on during the fall with great speed, to such an extent that the actual rise of the walls was 30 in. for each working day. There was a great deal of wet weather during this work, and the forms used in molding the concrete mass in place were but 3 ft. high, so that every 3 ft. or less the forms had to be lifted and reset higher, leaving the portion built, perhaps the day before, unprotected. It is probable that this, combined with the short time given afterwards for the whole structure to set and dry, was the difficulty, and that if no use had been made of the house till next spring it would have withstood any possible test. It is to be hoped so. No grain will be put into the building this winter and the broken part will be repaired in the spring.

There is an investment of not far from \$500,000 in the building as it now stands. It has a capacity for the storage of about 1,950,000 bushels of grain, and but half of the superstructure has been completed, the rest having been designed to be carried up next spring. The foundations for the entire building, as originally planned, have been completed.

NEW STEAMSHIPS FOR ANCHOR LINE.

Four new steamers are soon to be added to the Anchor line fleet plying between New York, European ports and East India. The first of these, which will be named Columbia, in honor of the United States, will enter the New York-Glasgow service. She will be of 8,500 tons gross and a deadweight capacity of 6,600 tons. She will be 485 ft. on the load water line, her beam 56 ft. and her depth of hold 36.5 ft. There will be accommodations for 216 passengers in the first cabin, 364 in the second and 700 in the steerage, the latter on the main deck and between decks. The Columbia is designed for 17 knots and will be driven by twin screws and quadruple expansion engines. Another ship will have greater speed than the Columbia and will run to Scotland. The two for the East India trade will be named Assyria and Numidia, each of 9,500 tons.

mates, Messrs. Beckmann and Gray; three quartermasters, six seamen and three lookouts; chief engineer, Mr. Vanzant; two first, two second and two third assistant engineers; three oilers, one machinist, six firemen and six coal passers; steward, cook, baker, assistant cook and four cabin boys. The accommodations throughout are unusually fine. The crew are quartered forward, where they are provided with white enamel beds, running fresh water in the wash room and shower bath. In the officers' quarters are fitted two shower and one tub baths. The staterooms are large and well ventilated. Three rooms are reserved for United States inspectors—a chief and two assistants.

It is expected that the Thomas will proceed to Norfolk the last of this week for complete trials of her dredging machinery. The bottom there is similar to that in New York harbor. She will there fill her hoppers with sand and then steam to sea to test her appliances for dumping. From Norfolk the Thomas will sail for New York, where she will begin immediately the work for which she was constructed. The marine department will launch on Thursday of this week the Mills, sister ship of the Thomas.

The Maryland Steel Co. has under various stages of construction eleven ships—three torpedo boat destroyers, Truxton, Whipple and Worden, each 248 ft. long; the hydraulic dredges above mentioned; a steel car float, 323 ft. in length, for the N. Y. P. & N. R. R.; a cargo boat for the Boston Towboat Co., 330½ ft. in length; two ships for the Boston Steamship Co. of 490 ft. each between perpendiculars, and two cattle ships of the same dimensions for the Atlantic Transport Co. The above aggregate 3,957 ft. 6 in. in length, 49,025 gross tons, 91,000 tons displacement and 51,300 I.H.P.

C. B. P.

Francis H. Clergue, who is conducting extensive water power and mining enterprises in the vicinity of Sault Ste. Marie, Ont., has left for England to establish an immigration office in London for the purpose of sending 500 immigrants a month to settle in Algoma during the next five years. Mr. Clergue predicts that in ten years 5,000,000 people will have settled in that part of Ontario. The latest company organized at Sault Ste. Marie, Ont., by Mr. Clergue is the Canadian Electro-Chemical Co., to manufacture chloride of lime and caustic soda by electrolytic methods. The raw materials consist of salt and lime. This company will be subsidiary to the American Alkali Co., which will operate on the American side of the canal.

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The Review has had little to say about Senator M. A. Hanna. During the four years in which he has been identified with national life it has been fairly silent about him. It has seen him villified and abused, misrepresented and maligned more than any other man in public life. What reason there may be for all this calumny is not known. It is certainly not the opinion of those who know him well at home. There is no man who has lived a more open or more honorable life. One is forced to the conclusion that the character of the man is generally misunderstood. "Where did he get his money?" shriek the saffrons of the east. It would be difficult to put one's finger upon a man who has worked harder for the wherewithal than Mr. Hanna. He has known nothing but hard work all his life and, indeed, his chief advantage over his fellow men is in his ability to work hard. He gained his wealth in the open market and in competition. "He is a labor crusher" cries another. For an answer on this score ask those who work for him. In all this country there is not a better organized house than that of M. A. Hanna & Co. and in no industrial organization of a like character are men better paid. During the street car riots Mr. Hanna's employes remained at work. They had no grievance and declined to join the strike. His vessel men have always been well fed and well paid. Mr. Hanna is regarded by his men as a model employer. But the caricaturists have preconceived him and have fashioned all his doings to meet their preconception. The general opinion of Mr. Hanna is that he is so saturated with commercialism that the dollar mark clings to his clothes. So universal is this view that the connection of Mr. Hanna's name with the shipping bill has been the source of its greatest weakness. But nothing could be further from the truth. Mr. Hanna is one of the truest of patriots. Such was the opinion of him in his own city long before he was known in national politics. In the selection of a representative American, one could not find a finer type. M. A. Hanna has done more for the United States of America than any score of its leading citizens, and in doing all that he has done he has been actuated by motives of the deepest patriotism. This patriotism in him, which partakes of the quality of piety, is so little comprehended by the public in general as to cause surprise when it is mentioned. But it exists and is the moving force in him. Does anyone suppose that that masterly effort in the senate last Thursday could be produced by a mere commercial mind? If so, he knows little of the arithmetic of state. That effort was the effort of a statesman.

For blood and bone and courage, for that combination of heart and brain which marks the manly man, Mr. Hanna is a rare example. Mere intellectual achievement which is not backed with truth fails to interest; one must be sincere to be convincing; but Mr. Hanna is both intellectual and sincere. There has been in many a day no speech to equal the one he has just made in the senate. It has been known all along that some of the best speeches made during the late campaign were made by Mr. Hanna. They were naturally hurried efforts, but there was meat to them. He embraced at once the center and circumference of his subject. One could feel the brain throbbing in his words. But it remained for his speech upon the shipping bill to reveal the depth and strength of his statesmanship. Its keynote was earnestness—that sincerity which carries conviction and is the parent of eloquence. It was a truly splendid bit of work. Spoken with ease and without notes, lucidly and logically arranged, it distinguished him as an orator.

The naval board on construction this week gave a hearing to Oliver Roland Ingersoll and Capt. Ira Harris of the army transport service, formerly a lieutenant-commander in the navy, on the merit of an improved self-righting, self-bailing life boat, of which Mr. Ingersoll is the inventor. Mr. Ingersoll said that two boats of this type were on every army transport, and he urged that his invention be adopted by the board for use on warships. Capt. Harris said the boat gave general satisfaction to the transport service. The board did not take action in the matter.

Senator Hoar on Mr. Hanna's speech on the shipping bill: "Mr. Hanna's speech was masterly. In manner of delivery and in force of argument it was exceptionally strong, and it was marked by great breadth of view and by genuine statesmanship. It was one of the most powerful speeches I have heard in my public career."

From London comes the announcement of the death of Michael G. Mulhall, who was widely known on account of his efforts to popularize the knowledge of the statistics of trade and population.

CAPT. STONE ON THE SHIPPING BILL.

Editor Marine Review: The subsidy bill, now being discussed in the senate, is a measure of vital importance to this country's best interests and one that has been endorsed by most of the leading men of our country in and out of congress for the past twenty-five years. It is therefore the opportunity of the hour to secure and foster, in a greater degree than at any time in the past, our industrial conditions by the passage of this bill. The opposition to this measure are asking "What is its purport except to pay money out of the public treasury for the benefit of a private enterprise?" It is this: A simple business proposition to expend not to exceed \$9,000,000 per year of the people's money in order that the same people may save and receive a net profit of \$100,000,000 annually, taking into account the earnings of our ships, together with the immense amount of labor employed in mining, conveying and turning into modern steamships, mountains of iron ore; giving opportunity to thousands of young men of our country to become skilled and efficient seamen, a calling that must remain sadly neglected unless the government shall by a liberal policy extend such encouragement, as well as to attract capital and enterprise in the upbuilding of our merchant marine. It has been strongly urged that we should let private enterprise build and run ships on the oceans, and having proceeded with this policy, it has resulted in our being able now to do only about 9 per cent. of our own shipping to and from our shores. There will not probably be a single argument brought against this bill during the entire discussion in or out of congress that has not been used against every government appropriation of money to further the interests of commerce since the government was established. The broader view, however, has prevailed and our country has progressed. The narrow view always made strict economy the "paramount issue," and, like a steamboat manager who allowed economy in the line of fuel to absorb his entire attention, stopped his steamer and saved the entire fuel expense. Of course the earnings stopped, but economy in fuel was maintained.

Whether the liberality of the government is manifest through a subsidy to ships, or appropriation for light-houses, harbors, deepening connecting waters or canals, it is one and the same thing in purpose and effect. Were it not for the progressive element in congress and the Michigan legislature which saw and grasped its opportunity to immortalize itself by building the Sault canal, an outlet and inlet to Lake Superior, our great west and northwest would still be a howling wilderness instead of furnishing a commerce to and from that region of \$250,000,000 annually in copper, iron ore, grain and lumber, and furnishing employment to armies of men. The volume of business made possible by the improvement of these waterways and consequent evolution in ships has steadily reduced freight rates on the great lakes so that in the very near future, should the government extend its assistance and encouragement to our ships beyond the shore line, our farm and manufactured products can be laid down in foreign markets in favorable competition with other producing nations. Thus the general developing process will go marching forward, while private enterprise will only receive its share by way of the increasing volume of business and necessary labor. The bill was certainly prepared by men who knew what was wanted on this score. No better representation from the shipping interests of the country could have been selected.

I believe this bill will only be opposed by those whose economy outweighs their statesmanship and whose arguments might be likened to the argument of a county commissioner against an efficient and substantial county bridge on the ground that there are so many people in the country that do not own teams; such range of mental vision, not extending beyond the fact of taking money from the public treasury, forgetting entirely the fact that this is only the process of taxing the property of the country that it may in turn be put into the hands of labor, insuring its immediate circulation without a dollar going out of the country for labor or material entering into the naval or merchant marine. It is earnestly hoped that the broader view will prevail and that economy on this question will not degenerate into parsimony, destroying this great opportunity of the fifty-seventh congress to mark its path by such action as will commend itself eventually, not only to the friends of the bill, but to its enemies as well.

JAMES STONE.

Cleveland, Dec. 19, 1900.

TORPEDO BOAT DESTROYER BAILEY'S PERFORMANCE.

If the official trip of the new torpedo boat destroyer Bailey equals the performance of the boat in its preliminary tests off Newport last week the United States government will come into possession of one of the fastest and finest torpedo boats in the world. The Bailey is at present under the command of Capt. W. A. Miller, the well-known master of the record breaking steam yacht Kanawha. The record was taken by Charles Seabury and officials from the Newport training station. The little craft went over the course which is technically 6,082 ft., a nautical mile, three times. The first run was made in 2 minutes 1 second; the second in exactly 2 minutes, and the third in 1 minute 58 seconds.

The Bailey carries a crew of fifty-eight. She is 210 ft. long, 19 ft. 6 in. wide and has a draught of 9 ft. 3 in. The contract calls for a speed of 30 knots an hour for two hours. The trial will probably take place on Thursday of this week off New London.

FLEET OF LITTLE REVENUE CUTTERS A GREAT SUCCESS.

Capt. Felix H. Hunicke, chief of the revenue cutter service of Cuba, who went to Elizabeth, N. J., a few weeks ago to take the fleet of revenue cutters built by Lewis Nixon to Cuba, writes Mr. Nixon as follows:

"As for our trip, there is so much to write that to give you any conception of our varied experiences I would have to take a day off. Suffice to say that we made it successfully, reaching Havana on Sunday, Dec. 3. We have lived through the severest gales that any small boat was ever caught in, and jumped bars and passed through surf that seemed mountains high without accident. I, who have so thoroughly tested every quality of these boats, can congratulate you far more than words can tell on the excellence of the fleet. Gen. Wood is more than pleased and so are all who have seen them. After making 2,000 miles we are ready to go to sea without one dollar of repairs."

ANDREW CARNEGIE ON THE CANAL TREATY.

Mr. Andrew Carnegie is opposed to the ratification of the canal treaty now before the senate and has given out the following statement regarding it:

"If there were no other reasons against the ratification of this canal treaty recent discussion would be sufficient. Senator Lodge, in charge of the treaty, and Senator Foraker, a lawyer of high repute, differ upon one fundamental point. Senator Beveridge asks for information upon three questions, each one important, upon the bearing of which he is unable to form an opinion. Much has been said about the Clayton-Bulwer treaty, as if treaties were eternal. It is the common practice to denounce treaties when conditions change. Mr. Blaine held the true position. When he was with me in London there was a dinner party, with some of the leading statesmen of Britain present, among them Mr. Chamberlain. The conversation turned upon Mr. Blaine's disagreements with England on the Clayton-Bulwer treaty. I shall try to give you the gist of the conversation.

"Mr. Blaine, you have not been friendly to England."

"I don't see why you should say so; I have always been friendly with England."

"You did not show it in the correspondence about the Clayton-Bulwer treaty."

"Well, when I read the correspondence passing between the two countries I found her majesty was always telling the president what she 'expected' and the president was telling her what he 'ventured to hope.' When I replied, I told her majesty what the president 'expected.'"

"Ah!" exclaimed one, 'you admit, then, you changed the character of the correspondence.'

"Not more than conditions had changed," Mr. Blaine replied. "When the Clayton-Bulwer treaty was negotiated we were a small, weak country, and expected to borrow the money to hold the canal from you; now we do not ask your money, and we have grown greater in population than Great Britain. Gentlemen, the republic is past the stage of 'venturing to hope' when any other nation tells us what it 'expects,' but if her majesty ever 'ventures to hope' we shall not fail to be as courteous and 'venture to hope' in return."

"It is unsafe for the United States to allow the slightest participation or the shadow of foundation for a claim to participation in anything pertaining to this continent. The Transvaal republic was independent, but it allowed Great Britain to object to any treaty which it might make with foreign powers and upon this slight co-operation with Britain that country has lost its independence, and has been annexed. If we give the slightest color to a claim of any European nation to have anything to say about the canal which American money is to build on American soil we shall make a grave mistake, and besides this we shall be false to the doctrine of the Republican party hitherto in this matter. When we come to attempting to hold possessions in Europe or in the far east there may be difference of opinion, but upon the policy of keeping this continent for the American powers upon the continent and of permitting no further increase of the foreign power we should be a unit. Far better no canal than one under the Hay-Pauncefote treaty. But there will be a canal; Britain needs only to see that we are in earnest and resolved that it shall be American and nothing else."

HYDROGRAPHIC SURVEYS OF THE LAKES.

Rear Admiral Bradford, chief of the bureau of equipment, of which the navy hydrographic office is a part, makes an earnest plea in his annual report for control by the navy of the work of conducting hydrographic surveys of the great lakes, which is now directed almost entirely by the army engineer corps. He says:

"The U. S. S. Michigan, fully equipped and continuously present on the great lakes, has been engaged in making surveys in localities where dangers to navigation are from time to time reported. The value of this work is very great and its importance can not be overestimated. The narrow channels connecting the lakes present many serious obstructions to the safe navigation of the great mercantile fleet passing to and fro from one extreme portion of these great inland seas to the other, and any efforts to provide additional safeguards by means of surveys, the construction of charts, the use of buoys, lights, etc., should be liberally provided for. With the expansion of commerce within recent years and the demand for cheaper rates of transportation the draft of vessels in these waters has been much increased. The government has just made an expenditure of \$15,000,000, which the Corps of Engineers of the Army has skillfully employed in deepening to 20 ft. the channels connecting the lakes. The keels of lake vessels are now reaching to depths which have not been explored by shipping in the past, and obstructions to navigation are being frequently discovered by some valuable ship loaded with a costly cargo colliding with them. It is of great importance that the rocks and shoals should be examined and correctly located, in order that their position may be represented on charts and thereafter avoided by passing ships.

"For several years past the Michigan has been employed in examining the usual routes of vessels in the western approaches to the Straits of Mackinac, with a view of forestalling further loss to great commercial interests by locating obstructions to navigation, in order that they might be marked by buoys or otherwise. These operations have proved that in the passage between Grays reef and Vienna shoals, through which the vessels of the large fleet engaged in commerce between Chicago and other ports of the lake system are continually passing, and in other parts of the approaches to the Straits of Mackinac the bottom is composed of boulders, which are within reach of the deep-draught vessels now engaged in the navigation of these waters, and which require to be located on charts. With this end in view, the Michigan has been employed during the present season in making a reexamination of Grays reef passage, in the course of which the rock upon which the Pathfinder and Malitoe were successively damaged has been fully developed. This survey and others which have been made from time to time by the officers of the Michigan are based upon the triangulation by the corps of topographical engineers of the army, carried on during the survey of the northern and northwestern lakes from 1840 to 1880.

"The steamer Rosedale grounded in Dec., 1897, on an unknown danger in the vicinity of Charity shoal, Lake Ontario. Several urgent appeals were made to survey this locality and mark the dangers to navigation.

The officer in charge of the branch hydrographic office at Buffalo was directed to make a full investigation and consult with the United States engineer officers in the vicinity of the lakes concerning the matter. He was unable to obtain any authentic knowledge of the dangers in question or that any survey was contemplated by these officers. The bureau, therefore, made arrangements to make a survey with the aid of a light-house tender loaned by the treasury department and the officers on duty at branch hydrographic offices. Upon arriving on the spot, for this purpose, it was ascertained that a survey had been commenced by the United States engineer officers three days before, and therefore the effort was abandoned, in order to prevent a duplication of work. When a danger to navigation is discovered it should be located immediately by a survey and prompt steps taken to warn all vessels of the obstruction. Delay may cause, not only a loss of property, but a loss of life as well.

"The navigation of the great lakes is difficult and dangerous. The mariner there must encounter severe gales and storms, and is always surrounded by and in the near vicinity of dangers to safe navigation. In the open ocean, when severe gales and storms, accompanied by atmospheric conditions which obstruct the vision, are encountered, the master of a steamship lays her head off shore and, with reduced speed, is comparatively safe. There is no off shore in the lakes, as a vessel can not proceed very far in any direction without encountering land or other dangers. Furthermore, the masters of lake steamers, on account of the near proximity of land, buoys, light-houses, and other stationary marks usually visible in good weather, have become accustomed to navigate by these aids, and do not rely so much upon the compass and chart as do ocean mariners. It follows in natural sequence that their requirements for visible aids to navigation are greater than elsewhere. They must make rapid voyages to and fro in order to be financially successful.

"The bureau has set forth the great value of our commerce on the lakes. It has briefly described the ships used and the methods employed to navigate them, and it now only remains to add that, in its opinion, too much can not be done for the safety of these vessels and their valuable cargoes. It is believed that the navy is more familiar with the needs and requirements for the safe navigation of vessels on the lakes than any other department of the government. For this reason the bureau is of the opinion that the hydrographic surveys of the lakes should be conducted by the navy, and that, in conjunction with the treasury department, which has charge of all buoys, the work of placing them being actually performed by naval officers, the navy department should decide upon what aids to navigation are necessary. It is not intended to include in these duties the construction of beacons, light-houses, etc., or to encroach in any way upon any work necessary in connection with river and harbor improvements. Whatever decision may be reached with reference to the work of providing aids for the safe navigation of merchant vessels, the navy must provide accurate charts for the use of its own ships on the great lakes. The waters of Lake Erie are historic in the annals of the navy; upon them was won one of the most brilliant naval victories in the history of the country. Who can say when another naval action may be fought in these waters, or how soon it may be necessary to transform peaceful merchant vessels into fighting ships? Whenever it may come, or even if it may never come, the navy must, at all times, be able to provide accurate means for the safe navigation of the ships of war now there or that may be there hereafter."

SHIP CONSTRUCTION IN THE LATTER HALF OF THE YEAR.

Figures compiled by the bureau of navigation, treasury department, show that the vessels built in the United States and officially numbered from June 30, 1900, to Nov. 30, 1900, were 495, of 149,963 gross tons. The principal items of the total are seven steel steamships on the great lakes (34,933 gross tons) and four smaller steel steamships (8,456 gross tons), which could pass through the new Welland canal, and one steel schooner-barge (2,790 tons). One steel steamship, John S. Kimball (1,588 tons), has been built on the Pacific for the coasting trade. On the Atlantic six large wooden schooners of 15,652 tons are included. The ocean steel steamships are the Morro Castle (6,004 gross) for the New York & Cuba Mail Steamship Co.; the Sierra (5,989 tons) and Sonoma (6,253 tons) for the Oceanic Steamship Co. (Spreckels), which are under the coasting law, between San Francisco and Honolulu, and for their entire Australian voyage receive mail subsidies; and the American (5,591 tons), for the American Hawaiian Steamship Co., which is under the coasting law. The steamship James S. Whitney (2,707 tons) is the only other large vessel and is for the coasting trade. The remaining 471 vessels (63,908 tons) obviously are small and generally for local trade. Unrigged barges and canal boats, aggregating 34,142 gross tons, have also been built. During December, up to Saturday, Dec. 8, the tonnage built and numbered was 9,723 tons, the large vessel being the steel steamship Ventura (6,253 tons), sister ship to Sonoma, and the Thomas (2,525 tons), steel steam dredge.

EX-PRESIDENT HARRISON OPPOSES SHIPPING BILL.

Some time ago Mr. C. S. Hernley, chairman of the Republican state committee of Indiana, charged that ex-President Harrison was in Washington working against the shipping bill, and added that as Harrison had advocated subsidies in 1888 it seemed inconsistent to oppose them in 1900. Mr. Harrison, upon seeing Mr. Hernley's statement, issued the following reply:

"I read in the Washington newspapers despatches from Indianapolis, that Mr. Hernley is seeking to assign me as in favor of the ship subsidy bill. I cannot accept the assignment. Mr. Hernley quotes me from a speech which I made in 1888, but I wish to say that there is nothing in the speech which I made then, or in anything I have ever said or done, that might be construed as an indication that I am in favor of the pending ship subsidy bill. The bill of which I publicly expressed my approval then was known as the mail pay bill, which was passed during my administration, awarding a liberal pay to steamships for carrying the mails. Any one that will take the trouble to read the two bills will note the difference, and it will not require a very astute mind to discriminate between them, I think. The statement that I was opposing the bill in Washington is quite unfounded. It has been my steadfast purpose to refrain from meddling with legislation, and I should not have said what I do now if it were not for Mr. Hernley's interview. I do not care to discuss the merits of the pending ship subsidy bill or of any other bill before congress."

SENATOR HANNA ON THE SHIPPING BILL.

HE DEALS WITH THE SUBJECT IN A STRAIGHTFORWARD, PATRIOTIC AND BUSINESS-LIKE WAY—THE BENEFITS OF THE BILL ARE WIDE-SPREAD AND WILL STIMULATE EVERY AVENUE OF INDUSTRY.

Senator M. A. Hanna in addressing the senate last Thursday upon the shipping bill jumped right into the middle of his theme. He wasted no words in his introduction, a style which was eminently characteristic of the man. First he spoke of the shipping of the great lakes and its wonderful growth during the past thirty years—all due to the fostering care of the government. Thirty years ago the largest cargo that a lake vessel could carry was 600 tons, and even that was thought so great as to inspire comment. Today there are many vessels which carry 6,000 tons and more. In his preface he traced the history of American shipping from the foundation of the government down to the civil war. Then continuing he said:

"In 1858 our shipping in the foreign trade aggregated 2,301,148 tons, an increase of nearly 100 per cent. over 1848. In 1861 it amounted to 2,496,894 tons, this being the greatest tonnage ever under the American flag in the foreign trade in any single year, although but 65.2 per cent. of our foreign commerce was then carried in those ships. In 1861 was reached the highest point in the ownership of American-built vessels under the American flag in the foreign trade. The tonnage under the American flag, in the foreign trade, in 1861 was more than three times larger than was engaged in our foreign trade under our flag during the year 1900. Think of that! Nearly forty years ago our shipping upon the high seas was three times greater than it is today. Could anything more clearly illustrate the decline of our merchant marine? When we consider that our foreign commerce is fully four times larger in 1900 than it was in 1861, and yet our shipping engaged in its carriage is but one-third of that of 1861, we bring into vivid prominence the shameful and humiliating decline in a great national industry—an industry at once promotive of national prosperity and at the same time an industry that at all times has been the one great bulwark of national defense.

OUR MERCHANT MARINE DURING THE CIVIL WAR.

"The civil war completely disorganized our entire ocean-going and coastwise shipping interests. The transfers of vessel property during those four years were enormous. The enemy captured and destroyed 104,605 tons; foreigners purchased 774,652 tons; there was built for or purchased by our government 417,521 tons; the government chartered 757,611 tons, and 664,505 tons went from the foreign into the domestic trade of the United States—a total of 2,818,894 tons of American shipping that thus changed hands. Our shipping under register had decreased 40 per cent., or was 1,000,000 tons less in 1865 than it had been in 1861. From carrying 65.2 per cent. of our foreign commerce in 1861 American ships carried but 27.7 per cent. in 1865. To a large extent our people gave up shipowning in the foreign trade during the civil war, and after the war there was everything to discourage them from re-entering. In the first place, those who had preserved their capital had it invested in other industries, from which there was nothing to induce them to withdraw in order to resume shipowning in the foreign trade. In the second place, steam was more rapidly displacing sail and iron displacing wood, and the construction of iron vessels being much more costly in the United States than in England, the cost of operating our ships being higher than the cost of operating foreign ships, the war taxes being then so high on everything, especially ships, and the government giving no protection to American in competition with foreign ships, naturally the American people dropped out of the foreign carrying trade, in which cheaper-built, cheaper-operated, and heavily subsidized foreign ships had already secured control.

"In a carefully prepared report on 'Foreign commerce and decadence of American shipping,' written on Jan. 25, 1870, Mr. Joseph Nimmo, jr., then chief of the treasury division of tonnage, and who subsequently became chief of the bureau of statistics, went into this subject at a time when we were but just recovering from the effects of the civil war. On page 20 of that report, which is executive document No. 111 of the second session of the forty-second congress, Mr. Nimmo summarizes his investigations of the subject and the information he had received, saying in part: 'The facts are stated as they were received. They seem to indicate an advantage in building iron vessels, on the side of England, of about 33 per cent. as compared with the United States.'

"Mr. Nimmo compiled his statistics after visiting the leading Atlantic coast ship yards and conferring with their owners and with the owners of ships in our foreign trade. On page 21 of his report he further says: 'It is probable that the relative cost of building iron ocean steamers in England and in the United States does not differ far from the above estimate, viz. 33 per cent.' His information was that from \$1 to \$1.50 more per ton was paid on freight carried in iron than was paid on freight carried in wooden vessels in certain trades. Again, there was an advantage estimated at 14 per cent. in the carrying capacity of an iron sailing ship as compared with a wooden ship of the same size, which increased to 28 per cent. in iron as compared with wooden steamers, for the reason that there was more buoyancy and less weight of material in an iron than there was in a wooden ship.

WHY OUR MERCHANT MARINE HAS DECLINED.

"In one of the tables accompanying his report Mr. Nimmo shows that the cost of operating for one year a 1,000-ton American wooden sailing ship, including insurance, depreciation, victualing, wages and the internal revenue tax, as compared with an English iron ship of the same size, was \$31,812 and \$19,674 respectively, or an advantage of \$12,138 or 61 per cent. in favor of the English ship as compared with her American competitor. Mr. Nimmo assumed each ship to cost \$90,000 in American currency. In figuring the cost of operation, while the wages of seamen largely contribute to the cost, the wide difference which is known to exist between the wages of seamen in the United States and those of foreign countries does not by any means make up the entire cost of operation.

"In those early days with which we are now dealing money was worth only one-half in England what it was worth in the United States. If a man borrowed capital to invest in ship building or ship owning, his interest was twice the amount of his competitor's and his taxes were

four or five times that amount, because it has always been the policy of the English government, in addition to the policy of directly subsidizing their mail steamers, to make such concessions in the application of their laws as in effect to give an additional subsidy to their ships. In other words, the tax on shipping property is almost nothing, and all their internal revenue laws exempt shipping. Everything was done in those days to help build up their power on the high seas, in commerce as well as in war. In another table he compares the yearly pay of officers and crew of a British and an American steamer of 3,000 tons as being \$36,649.06 and \$61,788 respectively, showing that the wage cost alone on an American steamship of this size was over 69 per cent. higher than it was on her British competitor.

"The conditions existing at that time have been changed very considerably, as I will show hereafter. Taking a \$3,000,000 line of American steamers owned in New York, and comparing it with a British line of the same value, Mr. Nimmo showed that the state, county and city tax, the duty on supplies consumed on shipboard, and the United States tax on passenger receipts and on the company's profits on the American line were \$155,500 a year, the British line paying as an offset but \$10,000 in Great Britain. Now, I am not claiming that those conditions apply today, but what I wish to bring out is that at that time, following the destruction of our merchant marine as a result of the war, when we were at the threshold, beginning once more to attempt at least to build up the merchant marine, we were confronted with the conditions to which I have referred. If those conditions have been bettered during that time, it is owing to the fact, more than any other, that the chairman of the committee on commerce of the United States senate has given his unfaltering support to every measure, as to this one, which has sought once more to rehabilitate us upon the high seas and restore the American flag to its rightful place on all the oceans of the world.

"Mr. President, I feel it a privilege on this floor to pay that tribute to the one American citizen who, during his whole public life, has made this question a study, and has brought to his assistance all the information of those who know about it, and who has studied and made applicable every advantage, natural or otherwise, which could be brought to reinforce and strengthen our merchant marine. Not only the building and operating of ships, but all other accessories which make the navigation of the oceans, of the rivers, and of our lakes easy and profitable have been a part of that great question, which has been forced upon the attention of the American people until, as I stated, today, in my judgment, there is no policy that appeals so strongly to the American people as does the building up of this great sea power of ours. If the facts and figures which I have given are not convincing as a reason to be assigned for the fall of our American shipping interests since the civil war, I know of none better to offer, because this whole matter is a simple business question as affecting the investment of capital, although I contend that there is another element in it which should appeal to the patriotism and pride of the American people. But that feeling can only be engendered after the fact has been accomplished, and the first thing necessary is to put the industry upon a basis so that it will attract capital, in order to insure its consummation. The business people who have been engaged in the foreign trade of the United States for the last thirty or forty years have met obstacles which seemed in many instances almost insurmountable.

"In the meantime, what has happened elsewhere? Everybody conversant with the development of ocean transportation knows that immediately following our civil war, when the people of the United States made the effort, which I have recited, to rehabilitate their merchant marine, the nations of the world, with their usual shrewdness and business perception, knowing full well the disadvantages under which the American people labored in view of those conditions, immediately began a rivalry to see which one could earliest secure for itself this great trade with the United States. Nation after nation followed each other in rapid succession, passing laws directly subsidizing steamers for any and every part of the globe. England, foremost by reason of her natural advantages, opened new ship yards until at last, within a very few years, miles—yes, I say miles—of ships upon the stocks were visible in the yards of Scotland, England and Ireland. From that day to the present time there has been no cessation of that effort, and, in proportion as the effort is made in this country, the effort is redoubled in the countries of our competitors, in order so fully to occupy the ground that there can be no temptation, even with the superfluity of capital in this country, to induce our people to engage in shipping. Any business man who has watched the drift of current events from the close of the civil war until today has found that to be the most prominent policy adopted in foreign competition with us in any direction. Every time a measure looking to the development of our shipping interests has been brought before a house of congress, immediately the agents and representatives of those in competition were on the ground ready, and anxious to defeat it.

"In this connection, I wish to say a few words in regard to the much abused American line of steamers. I do not propose to avoid any part of this issue. I do not propose to run away from the tongue of slander or the imputation of motives other than those to promote the best interests of the country on the part of any man connected in any way with this question from the beginning to the end. Several years ago a bill passed congress, passing the senate first, granting a mail subsidy to the International Steamship Co. It passed the senate after thorough consideration by the committee on commerce, and, as I understand, after thorough discussion of the question in the senate, and if it had become a law as it passed the senate it would have given to that line as compensation for carrying the United States mails, under the conditions enforced by the department, exactly what this bill would give. The compensation was considered fair and reasonable by the senate. The bill went to the house in the closing day of the session, and, under a spasmodic effort to chop things off, I suppose, as sometimes occurs, a certain percentage was stricken from it without any particular argument or reason for it, except perhaps that the committee on appropriations were cutting down expenses. There was no further time to consider the measure, and the conference committee adopted the report. But it then came to be a very serious question whether the men or company who had proposed to avail themselves of the benefits of the law would accept it or not. Their judgment was against it, but finally it was accepted as a venture, as I honestly believe inspired by no little patriotism, because along the seaboard of the Atlantic ocean there has always been a sentiment in favor of

the sight of the American flag at the masthead of ships and there has always been a feeling of humiliation that this great industry had been stricken down first by the combination of circumstances which I have recited, and latterly by a condition enforced here through the negligence or disinclination of our government to do that which was being done every year by every competitive government in the world. It was a close question whether the contract would be availed of, and I can say, from information given to me directly, that under that contract those four ships have never earned a net dollar. It is unfair to attribute unworthy motives to the men who have been engaged in this industry from the beginning of the development of our merchant marine, who have devoted all their energies and the best part of their lives to building up this industry, and who, when they appealed to the representatives in congress have been granted some consideration, perhaps undertaken on the part of the law-givers as an experiment, perhaps with the belief that after the experiment had been made, if found to be good, they could conscientiously go further in that direction. There are many people in this country who are honestly and earnestly in favor of building up our merchant marine, but I am sorry to say that they have been more or less affected by statements made in the newspapers, irresponsible statements, statements that cannot be supported by facts, as to the motives and purposes underlying this measure.

THE BILL DOES NOT FAVOR FAST LINERS.

"As to this bill offering any further inducement, even at the advanced compensation, for the people in this country engaged in that trade to continue the construction of fast liners as a matter of business investment, I doubt if anyone would venture any further in that direction. We all know that in the competition in trans-Atlantic lines today, England and Germany and France are all competing to have and to operate the ship which will cross the Atlantic ocean between Sandy Hook and the ports on the other side in the shortest time. We also know that that spirit of competition is in the way of advertising for the passenger traffic. Therefore I say that it is only a question as far as American interests are concerned how much loss they are prepared to meet in order to advertise their ships as the swiftest ships crossing the Atlantic ocean. There is no profit in the business; there never has been to that line, and there never will be under these conditions. And I say that in my own judgment and from my own standpoint there will not be another dollar, for years to come, of American capital invested in 21 or 22 knot ships.

"The foundation of this measure is based upon the proposition, first, to overcome the difference in cost of construction; next, the difference in cost of operation. The foundation of the subsidy measure is to begin at the minimum rate per mile sailed, which is applied to all ships alike. Then when you get above a 12-knot ship, where the relative cost of operation increases, doubles, trebles and quadruples almost upon each knot of forced speed, increased compensation or speed allowance, as we call it, is given to each class. For instance, the 8 or 10 knot ship under this bill receives so much per mile sailed on the gross tonnage of the vessel. Mr. Frye, in his speech the other day, explained better than I can those provisions; but I know this much, that under the operations of the bill the slow, low-power, heavy freight ship will derive the greatest benefit. A greater inducement is offered for investing American capital in those ships; and if the bill should become a law, it will be demonstrated as a fact which will be availed of by those seeking investment in shipping by the building up of the lower power, heavy freight ships.

"As you go to put into successful operation the provisions of the proposed law, where will you look for the accomplishment of its purposes, which is so earnestly desired, but to the men who have given their lifetime to the study and operation of each business which is peculiar unto itself? If we have a few ships engaged in foreign trade today all the better. If we can induce the men who are conducting that business to build more ships all the better; it accomplishes the result for which we are striving. If the upbuilding of the merchant marine of the United States depends upon the successful issue of the measure, it must be through the hands and under the administration of the men who know and thoroughly understand the business.

THE ADMISSION OF FOREIGN TONNAGE.

"The question of the admission of foreign tonnage to American registry is troubling many, and it troubled me. I have always been opposed, as a matter of principle, to giving advantage to ships constructed abroad. I was inclined to take a narrow view of that proposition when I was first called into the councils of this committee; but there are none of us who know so much upon any subject that we cannot learn something, and I learned from those discussions that it was necessary to protect the property and the capital of American citizens who had invested their money in foreign-built ships, who in the conduct of their business found it absolutely necessary that they should have ships, and finding it impossible because of the higher cost to build those ships in the United States, in order to further their business interests, were obliged to invest their capital in foreign-built ships and operate them under a foreign flag. In that way, owing to the rapid and continuous development of our export trade, in the growth of their business in connection with our affairs at home, and through energy and effort on their part, several important lines have been established and maintained fairly well against all competition. I speak now of foreign ships owned by American citizens and operated under a foreign flag. When it came to the consideration of this question in perfecting the measure which was to come before congress and the people of the United States it was very important that consideration should be given to everybody alike, and there was no attempt to do otherwise and no thought or desire to do otherwise. We felt that it was our duty as much to those who had acquired interests in ships under a foreign flag, without any prospect of anything better, and in the protection and development of their own business interests had invested their capital in that direction, that the only men who are experienced and able to put into effective operation the provisions of this law, must receive just as much consideration as those representing any other interest; and they did, but under different conditions. That was a concession made, and entirely made, to that spirit which dominates the American people, that we shall first take care of ourselves when considering the question of competition. The condition was made that for every ship owned by American capital and operated under a foreign flag, when their owners availed themselves of the provisions of this bill, the contract

would not be complete until they had constructed in the ship yards of the United States a tonnage equal to that coming under American registry. In that connection came the interest of the American ship builder.

JUST A COMMON-SENSE BUSINESS PROPOSITION.

"Mr. President, to my mind there never was a plainer business, common-sense proposition to justify action on the part of this government to give such aid as is necessary to attract capital and lay the foundation for the building up of this great industry, than is offered by this bill. Conditions in this country today differ widely from those of the time immediately following the civil war. I need not refer to those conditions, but steadily and sturdily have we been growing in importance in our commerce, in our industries, and in the development of our natural resources. There is one feature of this question which I desire briefly to touch upon, and that is from the standpoint of the ship builder. The upbuilding of the merchant marine of this country means more than many can appreciate without a careful study of the situation. The privilege which we give to those American citizens who bring under our registry a foreign-built vessel, requiring that they must build a compensating tonnage in this country, will make a demand, without any doubt, in the next five years, for more capacity than we have ship yards in this country to supply.

"Six hundred thousand tons—300,000 tons now in existence and 300,000 tons more to be newly built—would be added to our merchant marine, because under the provisions of this bill it is intended—and rightly so—that the benefits shall not be confined to those who first avail themselves of this \$9,000,000. Anybody and everybody can go on and build ships and then go to the secretary of the treasury and ask a contract under the same provisions, and when he has complied with the features of the law, given bond, and signed the contract, his ship can be registered for the foreign trade and begin earning the same proportionate amount of subsidy as that given to the ships which were built and in operation before the \$9,000,000 was absorbed.

"It was intended and it is expected that that provision of the bill as we grow in experience and ability, as we enlarge this sphere of industry, if it is found profitable, will attract idle capital not otherwise invested; and if it pays more than the normal rate of 2 or 3 per cent. interest—which has come to be the rate on the best securities upon which money can be invested—then it will have served the purpose that is intended, to not confine the size of this merchant marine in tonnage or number within the limit of the \$9,000,000—not that the \$9,000,000 is to be increased; but that any man who builds a vessel after that amount has been absorbed can come under the provisions of the bill, and that the necessary percentage shall be taken from the others and given to him.

A WORD ABOUT THE SHIP BUILDING INDUSTRY.

"One word about our ship building industry. I say, should this bill become a law, it will immediately affect that industry very perceptibly and very beneficially. What does that mean? Every ship that is built in a yard of the United States will be built wholly from materials furnished in the United States, beginning with the iron ore in the ground. Every additional ton that is demanded for this new industry will be an addition to the demand for labor in this country. It will take that many more men to mine that ore—and I speak now more particularly of ores from Lake Superior, which is the source of our main supply—to handle it on the railroads to the lake shipping points and then on vessels to the distributing points on the lower lake, then to furnish additional ships needed upon the lakes, additional men to man them, additional men to handle that ore upon the docks in its reshipment, additional men to aid the transportation to the point of manufacture, then through all the ramifications of that manufacture to bring that iron ore into a condition to go into the ship and during the construction of that ship until she is slipped upon the waters and is a part of the merchant marine of the United States, thousands of men will find employment in an industry heretofore comparatively unknown to this country.

"Mr. President, when we look at the rapid growth of the population of the United States, aided so largely, as it is, by immense immigration, over half a million of people coming to our shores every year from foreign countries, attracted here by the belief, in fact, by the certainty, that they can better their condition, and when we find in that connection that the production in the United States is one-third larger than our consumption, we are met with a very serious proposition, a proposition which, from an economic standpoint in connection with this interest and any other legislation, should command our most serious consideration. I say our productive capacity is one-third larger than our consumption. One of two things must happen; we must either find a foreign market for that surplus or we must curtail the production one-third. What does that mean? In the conditions existing today it would mean to throw out of employment thousands and thousands of our workingmen. Why, then, is it not better sense and better policy to study all the conditions from the American standpoint of bettering them for ourselves and bettering the conditions of the people who look to us? It is just as much the duty of congress to consider a question of that kind as it is for the manufacturer. When he finds his market will not consume his product he must consider what he had best do to first protect his own interest, which he does, and that of those who are dependent upon him; or, if he be public spirited and enough of the philanthropist, he would consider those interests mutually, and would study the subject in order to avail himself of every opportunity to discover some method, even at less profit to himself, to find a market for that surplus product. There is no country on the face of this earth that is so richly endowed with mineral wealth as ours. There is no section of this country that has more undeveloped mineral wealth than the border states of the south.

WIDESPREAD BENEFICENCE OF THE BILL.

"Mr. President, the limit of exports today is reached by the inability to secure transportation upon the high seas. In order successfully to operate and carry out great industries of that kind, looking to a foreign market, it is not only important but absolutely necessary that the manufacturer shall know what it will cost to deliver the goods. He must know what it will cost every month of the twelve months of the year if he attempts to predicate his operations upon the demand and the business that he can build up in the foreign trade.

"The United States has changed its condition from a debtor to a creditor nation. We are not only loaning money to foreign countries,

purchasing their bonds, but we are loaning to them millions of dollars which come to us as the balance of trade and which are left in their hands because there is greater remuneration abroad than at home. Is it not better for the American people that they shall invest that capital here in any of the variety of industries which will not only call capital into activity, but will furnish bread for thousands and thousands of men, women and children who are a part of us, depending upon us, and who in all conditions must be considered? The question of the employment of labor and the continuance of it is one that the American people must meet, and meet boldly; and any policy that will contribute to that end in any legitimate way should commend itself to those who are called upon to act in public stations. They should act from conviction in the interests of the whole people, and from nothing else.

"I alluded to the development of the southern states. The coal and iron industries in the south are yet in their infancy. There are there wonderful deposits of both minerals awaiting development, and the people who control those industries have told me time and again that the one difficulty they meet with every year in building up the export trade is the lack of adequate and regular transportation. I have known, since this measure began to be discussed in congress, within the last three years, of several enterprises which contemplated the organization and establishment of a line from Pensacola to South America and one from Norfolk to South America and another to a Mediterranean port, awaiting your decision upon this question. That development will do more for the rapid consummation of the hopes of our friends in those states than anything else, because in connection with that comes further investment of capital in those industries, and the greater the facilities the better the opportunity to increase that trade, the greater the demand for more capital. What we want in this country is to continue in this development and in the growth of our material wealth, and then to find an opportunity for the application of it.

"This question is broader than the lines of the bill can write it. It will be widespread in its benefits. It is not aimed at any class or any particular industry. It is one of those measures the influence of which will permeate every industry and every class in the length and breadth of the United States. When I am told that the people of the interior of this country are not interested in the shipping question—that the farmers take no interest in it—I say it is not true in fact. I know that every man, no matter what his vocation in life, is interested and will be benefited, directly or indirectly, because you cannot create an industry like this, bringing about, as it must naturally, first the development of our raw materials and then a condition which ends with the construction of the ships, opening up the markets of the world, giving greater opportunities to our merchants and manufacturers, without benefiting every industry and every line of business.

"When I say that a measure of this kind is in the interest of the whole people of this country, I mean it. The farmer who wants to dispose of the products of the soil, who can raise more wheat, or corn, or oats, or other products than can be sold in this country, complains that the markets of Liverpool fix the price upon his commodity. If that be so, then why not look elsewhere for wider markets. Why not take advantage of the situation in the east? I predict—and I do it because I believe it—that, should this bill become a law, inside of ten years there will scarcely be a bushel of wheat shipped from the Pacific coast to Europe.

CONSIDERATION IS HIGHER THAN MERE DOLLARS AND CENTS.

"There is one more feature, but I shall not trespass longer upon the patience of the senate. I wish to ask one question. Suppose there should be a war between Germany and England, or between England and France, or between any of the great European powers, particularly any of those three, which are the greatest maritime powers of Europe. Ninety-two and five-tenths per cent. of our entire export trade is today carried in the ships of England, Germany, France, Norway, Sweden and Holland. Suppose a war should break out between any of those great maritime powers, with the conditions—that always follow war, particularly now, when each one of them has been growing in naval power every year until the destructive powers of the navies of Europe would entirely obliterate the whole merchant marine of the world as a consequence. What would become of us? What would become of the farmers then? What would become of the manufacturer looking to a foreign market to dispose of his surplus? What would become of the men who are working in the mines and the factories with that business absolutely paralyzed? We would have no ships, although a neutral power, to take up and continue that necessary transportation in order that our goods may be carried to markets; and until the war should cease or until some other remedy could be supplied the condition of the United States would be absolutely deplorable and beyond remedy.

"If you bring it down to a question of dollars and cents as weighing against the higher considerations, when those conditions come upon us as a sequence of war, and we are asked what would we not give had we a merchant marine, being a neutral power, to go on with the export of our products and not suffer the consequences of the war, would we stop to consider the whole amount of the subsidy, \$9,000,000, multiplied by the twenty years of the existence of this contract, as a price to be paid in cash to remove such conditions as would bring ruin upon us for at least awhile? Oh, no, Mr. President, in making my appeal to the American people for this great industry, I want to put it upon higher grounds than that of dollars and cents. I want to put it upon the broad ground of a connecting link between the producer and the consumer, as an adjunct to our further growth and prosperity, which it is written must continue in the nature of things because of the conditions which control us and our future—conditions which rise above the speculative question whether one man will get a little more benefit than another, conditions which appeal even to our benevolence in the responsibilities that we owe to the working people of this country.

"As to the popularity or the unpopularity of this measure, I stand here today in the presence of the whole American people and claim that this kind of legislation is inspired by the best sentiment and the wisest experience of those best qualified to judge its merits. I am standing here as the exponent of that principle, and I claim for every line in the bill that it is in the interest of the whole people of the United States, and particularly of those who must look to higher and more experienced authority to conduct the public affairs of our government in their interest. Upon that basis I make my appeal, and I leave it in your hands."

A COMPLAINT REGARDING THE SHIPPING BILL.

Charles M. Taylor's Sons of Philadelphia, managers of the Philadelphia Transatlantic Line, operating between Philadelphia and London and between Philadelphia and Bristol via Avonmouth, have a complaint to make regarding the ship subsidy bill and have addressed a letter on the subject to all members of congress. They have also submitted a copy of the letter to the Review for publication. They say:

"The ship subsidy bill in the amended form in which it was reported to the senate, Dec. 7, while framed ostensibly in the interests of American commerce, is open to the serious objection of favoring a few American corporations only and excluding all other American interests from the enjoyment of many of the benefits of the proposed act. As now drawn, only those foreign-built vessels may be admitted to American registry, and to participation in the compensation stipulated in the act, which were either already engaged in trade from United States ports, on Feb. 1, 1899, and at that time either owned in full or in majority by United States citizens, or such foreign-built steamships as may have been under contract for construction and copies of such contract filed with the secretary of the treasury on or before Feb. 1, 1899.

"It will be apparent to every fair minded person that such a provision, based upon such arbitrary conditions, which must have been complied with nearly two years ago, is most un-American and unjust. Such an act would be a species of special legislation of the most obnoxious type, conferring exclusive privileges upon a favored few. If, as must be assumed to be the case, it is the desire of the promoters of the subsidy bill to advance American commerce and American ship building, we submit that it should be by means of legislation whose benefit shall be open to all, rather than framed so as to exclude all but a favored few from participation in one of its most desirable features. The admission of foreign-built tonnage to American registry, even coupled with an obligation to build in the United States an equal tonnage, is a privilege sufficiently valuable that it should not be restricted in the manner of the present senate bill. We earnestly urge that this portion of the bill be amended so as to permit within carefully defined limits any American citizen or corporation, who will undertake to build in the United States a first-class steamer on lines to meet modern commercial conditions, to buy and have admitted to American registry a similar foreign-built ship; such offer to hold good until a specified number of steamers should be constructed. These are the terms upon which the St. Paul and St. Louis were built, and if these terms were made available for the general public it would seem to be an equitable incentive to the upbuilding of American commerce and American ship building on American principles."

"Should this suggestion, however, not meet with favor, there is an alternative, which would make the present bill much more fair, namely, the elimination entirely of all provision for the payment of subsidy to foreign-built vessels. Then the bill would be without the special features which now lay it open to the criticism of special legislation. In its present form the bill, instead of serving to promote American commerce in any large or healthy way, tends really to stunt its development, except through the medium of two or three favored corporations, into whose hands the provisions of the present bill very largely divert its benefits. We ourselves have been for years operating established lines of transatlantic steamers, and have for some time been laying our plans for the building of American steamers, as a part of a fleet to be engaged in transatlantic commerce, but the passage of a measure like the present senate subsidy bill would put us under such a burdensome handicap with respect to competitors, whom this bill especially favors, that we may be entirely barred from the consummation of our plans in this respect.

"We are and have been, in common with many of the prominent commercial organizations of the United States, in favor of the passage of a fair and equitable ship subsidy bill, but for the reasons above indicated the pending measure does not aptly and equitably meet the requirements of the situation. Our interest in the subject of the enlargement and extension of American commerce and the facilities therefor is indicated to some extent by the fact that our steamship lines carried from the port of Philadelphia for foreign ports during the current year 681,856,000 lbs. or 304,400 tons of the products of our farms and factories."

BOSTON'S CUP DEFENDER.

A Boston dispatch says there is a possibility that the Boston cup defender will be built at the Atlantic Works, East Boston, instead of at Lawley's yard, City Point. One of the reasons why Lawley may have the boat built in East Boston is his desire to have a forge exclusively for the Lawson boat metal work. Already material for the boat is beginning to arrive. Some of the mahogany for the hatches and interior work has been delivered at City Point. A contract has been made with Walter Coleman & Sons of Providence to furnish the blocks, and as soon as Crowninshield furnishes the specifications these important portions of the boat's gear will be made. The steel frames have been ordered from the same concern in Pennsylvania that is building a set for the new Herreshoff craft.

Mr. Lawson is much displeased with the publication of reputed interviews, in which he has been placed in an antagonistic attitude to the New York Yacht club. His feelings toward the members of that club are most friendly and he entered into the competition without the slightest idea of trying to gain membership in the club or enter his boat in the trial races if it were not perfectly legitimate for him to do so. His sole desires are to prevent Sir Thomas Lipton from "lifting" the cup, and to add new interest in the races by having the product of more than one naval architect's genius compete for the honor of defending the much-coveted trophy. If Herreshoff beats Crowninshield Mr. Lawson will be the first to take his hat off to the former, and he does not doubt that if the trial races result in a victory for the Boston boat the New York syndicate and Herreshoff will return the salute in the same spirit. All the talk about not allowing the Boston boat to compete in the trial races is regarded as premature and unsportsmanlike.

The Nickel Plate road will sell holiday excursion tickets on Dec. 22, 23, 24, 25, 31, and Jan. 1 at a fare and a third for the round trip, tickets good returning until Jan. 2 inclusive, on any one of our peerless trio of daily express trains where scheduled to stop. Write, wire, 'phone or call on nearest agent, C. A. Asterlin, T. P. A., Ft. Wayne, Ind., or E. A. Akers, C. P. & T. A., Cleveland, O.

271, Jan. 1.

PHILADELPHIA COMPANY'S PNEUMATIC TOOLS.

It is announced from Philadelphia that owing to its inability to fill orders promptly, the Philadelphia Pneumatic Tool Co., Stephen Girard building, is making arrangements to further increase its capacity. The company reports a large increase in business for November over previous months. Their pneumatic hammers are in special favor, as evidenced by duplicate orders received from some of the largest manufacturing concerns in the country. Recent improvements in their long-stroke riveting hammer have given very satisfactory results and they report a large number of orders booked ahead. In one day in November they shipped eleven of these long-stroke hammers besides the shipment of other orders. The use of compressed air for foundry work has been largely increased by the adoption of sand rammers, and this company recently put upon the market a rammer that is not only a labor saving device, but is doing better and more uniform work than by old methods. A large number of these tools have been sold and are proving very successful. Mr. Robert T. Mickle, M. E., formerly with the Kensington Engine Works, Ltd., Philadelphia, has been elected vice-president of this company, to fill the vacancy caused by the resignation of Mr. George W. Borton.

Separate circulars, neatly printed and well illustrated, are gotten out for this company's hammers, reamers, rotary drills, rammers, etc., and will be forwarded upon application.

LARGE FORGINGS.

Among orders now on hand at the works of the Bethlehem Steel Co., South Bethlehem, Pa., may be noted the shafts and engine forgings for one of the new ferry boats which are under construction at the yards of Harlan & Hollingsworth Co., Wilmington, Del., for the New York ferry of the Central Railroad Co. of New Jersey.

The Bethlehem company has closed a contract with the General Electric Co. for six more weldless field rings of Bethlehem nickel steel for the extension to the big power plant at Niagara Falls. These rings measure 142½ in. outside diameter and 130¾ in. inside, leaving the walls 5⅞ in. thick. The width of face is 50¼ in. and the estimated weight of each ring is about 35,000 lbs. They will be worked up on a mandrel, under the hydraulic press, and are said to be among the largest forgings of this sort which have yet been produced.

REPORT FROM A LARGE MANUFACTURING CONCERN.

In order to provide facilities for conducting its rapidly increasing local business, the B. F. Sturtevant Co. has just removed its Chicago office to much larger quarters at 281-289 South Clinton St. It is reported from the Boston headquarters of the company that business of the past year has been the largest in its history. In the line of standard types of blowers, exhausters and hot blast heating apparatus, its products have kept pace

with the recent industrial movement. But in the installation of fans for the production of mechanical draft for steam boilers the desirability of this method in preference to the chimney has been shown by a great increase. The volume of domestic and foreign orders for forges has been noticeable, while the output of the rapidly-growing electrical department has been far in excess of the previous year. This electrical output has been principally in the specialties of the company, namely, electric fans of all types and small high-grade generating sets. New applications of fans are constantly presenting themselves, and the careful study which this company gives to the solution of such problems is one of the main factors in its growth. All departments have been taxed to the utmost and the outlook is favorable for the continuation of this condition.

NANTUCKET LIGHTSHIP WAS ADRIFT.

Little lightship No. 58, stationed off Nantucket shoals, built by the Craigs of Toledo, was swept from her moorings last week and was adrift for seven days. There was little coal and food aboard and the captain and crew of five men suffered considerably from cold and lack of nourishment. The boiler of the vessel gave out during the buffeting and the crew tried to navigate her with a sail. The vessel was in distress when she was picked up by the British tanker Lucille and towed to the Delaware breakwater. Nantucket shoal is the most dangerous place along the Massachusetts coast. The liners, noting the absence of the ship, were compelled to make the turn by soundings. It is to be noted that the crew of the lightship were more worried over the fact that the shoal was left unprotected than they were over their own personal safety.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland,
date of December 19, 1900.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
American Steel & Wire.....	44¾	44¾	43¾	43½
American Steel & Wire, Pfd.....	88	88¾	87¾	88¾
Federal Steel	54¾	54¾	53¾	53½
Federal Steel, Pfd.....	79	79	78½	78½
National Steel	42	42	39¾	40¼
National Steel, Pfd.....	93	93¼	93	93¼
American Tin Plate	54½	55¼	51½	54¼
American Tin Plate, Pfd.....	91	91	90	90
American Steel Hoop.....	32¾	32¾	30¾	31½
American Steel Hoop, Pfd.....	77¾	77¾	76	77
Republic Iron & Steel	16¾	17	16	16¾
Republic Iron & Steel, Pfd.....	64½	64½	64	64¼

American Bridge Co.

General Offices, 100 Broadway,
NEW YORK, N. Y.

DESIGNERS
AND BUILDERS
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We have decided to carry at all our plants a large stock of Raw Material, from which we can furnish with great promptness any ordinary order for Steel Bridges, Roofs, Buildings, Columns, Girders, Beams, Channels, Angles, Plates, etc., etc.

BRANCH OFFICES and WORKS:

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COLUMBUS, OHIO.
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ATLANTIC AND PACIFIC COASTS.

PROGRESS OF CONSTRUCTION NOTED IN THE VARIOUS SHIP YARDS—SOME LAUNCHES AND SOME NEW CONTRACTS.

The National Dredging Co. of Wilmington, Del., has contracted with the Neafie & Levy Ship & Engine Building Co., Philadelphia, for a new wooden hull tug boat, which will be practically a duplicate of the Gerry, new last spring. It is likely that the hull will be built by the Jackson & Sharp Co. at Wilmington, the Neafie & Levy Co. installing the machinery. The vessel will be 110 ft. long between perpendiculars, 24 ft. beam and 10½ ft. deep. She will have a compound surface condensing high pressure engine with cylinders of 18 and 36 in. by 26 in. stroke, and a Scotch boiler 12 ft. in length and 13 ft. 6 in. in diameter, with a working pressure of 125 lbs. to the square inch. She will be fitted with steam steering gear and all modern appliances, including an electric lighting plant. The vessel will be completed about April and will go at once to Mobile, Ala., to engage in towing barges now used in dredging the harbor at that place.

George E. Hitchings, proprietor of the Hoquiam, Wash., ship yard, is carrying on quite an extensive business in the building of wooden vessels. He will put down two keels of wooden vessels during the first of the year. He is now building a four-masted schooner for the lumber trade. This vessel is 185½ ft. long, 38½ ft. beam, 14½ ft. depth of hold and will carry 1,000,000 ft. of fir lumber. The vessel will be named Mahukona. She will be completed about Feb. 1. Mr. Hitchings completed two other vessels from the same moulds this year.

A new freight steamer, the Sagamore, for the Dyer Transportation Co., was launched from the ship yard of the Read Marine Railway Co., Fall River, Mass., recently. She will be operated as a freight boat between Fall River and Providence. The Sagamore is 110 ft. in length, 25 ft. 10 in. beam, 8 ft. depth of hold, and is designed to carry 300 tons. She will have a fore and aft compound engine with 12 and 26 in. cylinders by 12 in. stroke, to which steam will be supplied by two upright boilers.

Washburn Bros., Thomaston, Me., launched the schooner Joseph P. Thomas, a wooden vessel of 1,564 gross tons, a few days ago. Dimensions of the vessel are: Length, 220 ft.; breadth, 42 ft. 8 in.; depth, 23 ft. 4 in. The frame is of Maine material, planking and ceiling of Georgia pine, and the four masts, each 106 ft., of Oregon pine. The equipment of machinery for handling sails, steering purposes, etc., is modern in all respects, including stockless anchors.

The Bell-Nelson Mill Co. of Everett, Wash., has just secured an order

from San Francisco for the construction of a wooden barkentine of 204 ft. length. The Bell-Nelson company has a passenger steamer well under way, and at the ship yard owned by C. G. White in the same town a four-masted wooden schooner is in frame. Mr. White is improving additional water front for ship building and will soon put down the keel for another schooner.

Sea-going barge No. 5 of the Rockland-Rockport Lime & Cement Co.'s fleet, constructed at the works of the Pusey & Jones Co., Wilmington, Del., for the Harlan & Hollingsworth Co., is ready to leave the wharves of the builders. The gun barge constructed by the Pusey & Jones Co. for use at Indian Head, is completed and the builders are now awaiting the orders of the proper authorities for its shipment.

Neither the William R. Trigg Co. of Richmond, Va., nor the Maryland Steel Co., Sparrow's Point, Md., made any effort to obtain contracts for the heavily armored warships for which bids were recently opened. It is understood, however, that they will enter the competition for the protected cruisers without opposition on the part of some of the leading ship yards.

A new four-masted schooner, the Forester, built by Hay & Wright, at Alameda, Cal., for Martin Saunders and others, is a sister ship to the Commerce. She is 184 ft. long, 38 ft. 6 in. beam and 13 ft. 6 in. deep. She will carry 900,000 ft. of lumber. From San Francisco the Forester will go to Puget sound in ballast and there load lumber for Australia.

During the past week the Fore River Engine Co., Weymouth, Mass., moved its big four-story office building down the river to Quincy Point, where its new plant will be located. The building was floated on lighters and attracted great attention as it moved down the stream. The company, when reorganized, will be known as the Eastern Construction Co.

The Walter Corey Co., Portland, Me., has been given the contract for the furniture and fittings of the new steamship which is being built at the Roach Ship Yard, Chester, Pa., for the Maine Steamship Co. This vessel will be 7 ft. longer than the Horatio Hall, but in construction will be similar to that beautiful craft.

If you contemplate a trip either west or east you can secure advantages not found elsewhere if you will write, wire, 'phone or call at the city office of the Nickel Plate road, 189 Superior street, 'phone main 218, or ticket agents Euclid avenue station, 'phone Doan 817. Rates and tickets, first or second-class, to any point authorized east or west at any station on the Nickel Plate road.

245, Dec. 31

Paris Exposition, 1900, confers Highest Award and 2 Gold Medals

(Only Gold Medals in this Class.)

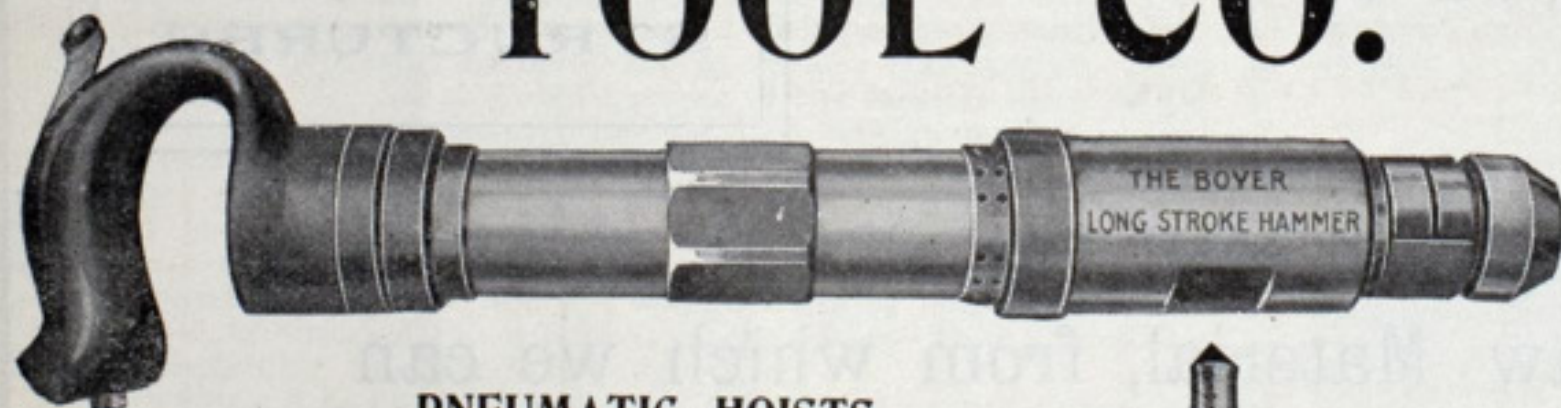
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for Chipping
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for Shipyard use
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ON CHICAGO PNEUMATIC TOOL CO.



DRILLS

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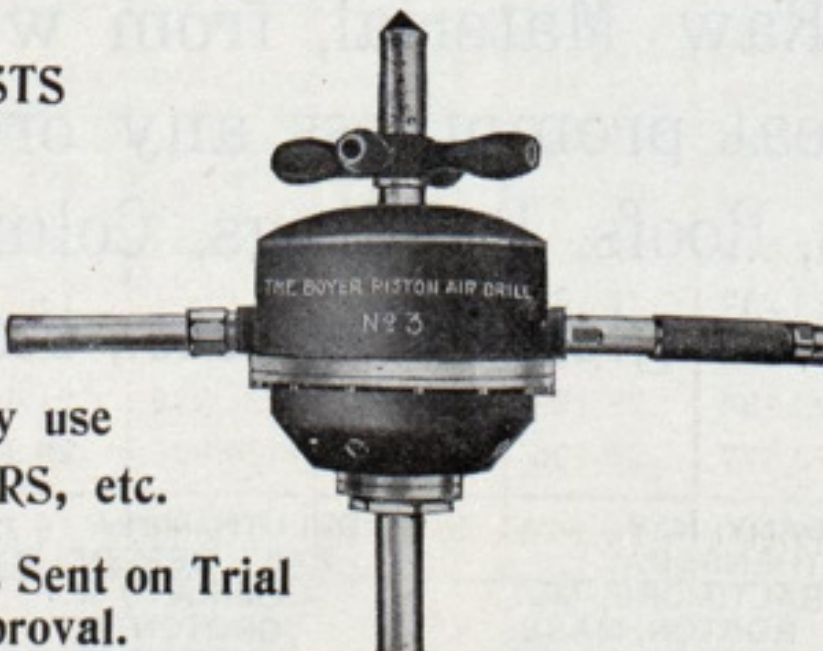
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Pneumatic Appliances Sent on Trial
Subject to Approval.

By actual statistics 95% of all
Pneumatic Tools sold all over
the world are our tools.

UNITED STATES COMMISSION
TO THE
PARIS EXPOSITION OF 1900

PARIS 20 AVENUE RAPP CHICAGO AUDITORIUM BUILDING NEW YORK EQUITABLE BUILDING
PARIS OFFICES,

August 21, 1900.

Chicago Pneumatic Tool Company,
Chicago.

Gentlemen:

Officially I desire to inform you that your pneumatic tools received at the hands of the International Jury of Award, a Gold medal. Also that Mr. Boyer was awarded a Gold Medal as collaborator and inventor of the tools.

Yours very truly,

F. E. Smith
Director of Machinery & Electricity.

New York Office:
95 LIBERTY ST.

CHICAGO PNEUMATIC TOOL CO. GENERAL OFFICES:
Monadnock Block, Chicago.

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Austria; Stockholm, Sweden. H. GLAENZER & PERREAUD, 1 Avenue De La Republique, Paris, France and Spain. H. W. PRABODY & Co., Sydney,
New South Wales.

THE STEAM TURBINE.

A paper on "Steam Turbines," read at a recent meeting of the Engineers' Society of Western Pennsylvania by Mr. Francis Hodgkinson, is very probably the most valuable contribution along the lines of this interesting and instructive branch of steam engineering as yet put forth in this country. A copy of the paper was very kindly forwarded to the Review by the Westinghouse Companies' Publishing Department, Pittsburgh. Mr. Hodgkinson was identified with the development of the turbine in England, and since 1896 (the year Mr. Westinghouse acquired the American patent rights of the Parsons' steam turbine) has been employed by the Westinghouse Machine Co. to carry on the development of the machine. Excepting the Hon. C. A. Parsons himself, probably no one can be considered more of an authority on the subject than Mr. Hodgkinson.

The paper is accompanied by some twenty-five photographic illustrations and drawings. Mr. Hodgkinson first gives a brief review of what history records of turbines back to the time of Hero in ancient Egypt. He notes that Mr. Parsons, with a view to exploring the possibilities of a reaction steam turbine, constructed one on the lines of Hero's engine. The sphere was replaced by two hollow oval sectional arms, mounted upon a hollow shaft, with jets at the outer ends, through which the steam issued tangentially to the place of motion. The whole was enclosed within a cast iron case and connected to a condenser. With 100 lbs. per square inch at the jets, and 26-in. vacuum in the exhaust casing, a speed of 5,000 revolutions per minute was attained and 20 H.P. developed. The consumption of steam was 40 lbs. per brake horse power.

"It is not a little remarkable," Mr. Hodgkinson says, "that the latest development of steam engineering should be returning to the earliest form of engines of which we have record. It is still more remarkable that the engine, as described by Hero, had greater economy than any steam engine produced for eighteen or twenty centuries later. The fundamental principle of the steam turbine, in contradistinction to the reciprocating steam engine, lies in the fact that the latter does work by reason of the static expansive force of the steam acting behind a piston, while in the former case the work is developed by the kinetic energy of particles of steam, which are given high velocity by reason of the steam expanding from one pressure to a lower."

Steam turbines may be divided, the author says, into three classes. First is the impact, of which Bianca's is an example; second the reaction, of which Hero's is an example, and third, a combination of both of these, of which Parsons' is an example. In the paper he deals with the two forms which have attained some degree of commercial success, namely, the Parsons' and the de Laval, particularly the former.

Mr. Hodgkinson thus sums up in concluding his paper the application lately of steam turbines to marine propulsion: "The first vessel, named the Turbinia, was built with a view of exploring the possibilities of turbines for this purpose. It was, therefore, built as small as possible,

and at the same time not so small as to preclude the attainment of high speed should the experiments turn out a success. The dimensions selected therefore were 100 ft. long, 9 ft. beam, 3 ft. draught, and 44 tons displacement. It will be noted that the ratio of beam length is unusually small—9:100, while 10:100 or 11:100 is the more usual practice for this class of boat. To begin with, the boat was fitted with one single turbine and propeller. The result was disappointing, the chief trouble being due to cavitations in the propeller, resulting in excessive slip. This was verified by experiments in a tank of water subjected to vacuum. The appearance of the action of the propeller in the water was observed by looking through a slot in a disc which was made to revolve in synchronism with the propeller under observation. It was then considered necessary to make several changes. New engines were built in three sections, the steam expanding through them in series, each section driving an independent shaft, and each shaft three propellers. Very soon 32¾ knots were attained, and eventually 34½ knots at the naval review at Spithead in 1897. About 2,300 I.H.P. were developed. The boiler, a Yarrow type with small tubes, had 1,100 sq. ft. of heating surface and an evaporation of about 28 lbs. of water per square foot of heating surface at 34½ knots speed. About 600 H. P. were developed per ton of machinery and 50 H. P. per ton of total weight of vessel in full equipment.

"These successes resulted in a contract with the British admiralty for a torpedo boat destroyer named the Viper. The dimensions were the same as the 30-knot destroyers of her class, 210 ft. beam and 350 tons displacement. The engines consisted of two independent sets, each consisting of one high pressure turbine driving a shaft and one low pressure turbine driving its shaft. On the same shaft as the low pressure was permanently connected a small turbine for reversing purposes. When running ahead the reversing turbine was in connection with the condenser, so that the frictional losses due to this turbine running idle were very small. The same fact applies to the go-ahead turbines when running astern. There were, therefore, four propeller shafts, each fitted with two propellers, the one ahead having a slightly lesser pitch than the after ones. The Yarrow type boilers have 15,000 sq. ft. heating surface; grate surface, 272 sq. ft.; condensers have 8,000 sq. ft. surface. The speed attained was 35 knots to begin with, and later 36.858 knots were reached."

As a final conclusion it is said that engineers generally consider "that but little more may be anticipated in the development of the reciprocating engine. Any improvement that may be imagined would not very materially improve its efficiency as a heat engine. On the other hand the turbine is capable of development in many ways, particularly in the use of superheated steam, to a degree hitherto prohibitive, so that the day may not be very far distant when the turbine will replace the reciprocating steam engine for most purposes."

Fire in the Norfolk navy yard Sunday night destroyed 7,000 drawings in the naval constructors' rooms and burned up much valuable live oak and mahogany. No statement of the damage has as yet been obtained, but the loss is heavy.

BELLEVILLE GENERATORS

Grand Prix 1889
Originated 1849

Hors Concours 1900
Latest Improvements 1896

Number of Marine Leagues made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australian	Polynisien	Armand Behic	Ville de la Ciotat	Ernest Simons	Chili	Cordillere	Laos	Indus	Tonkin	Annam
1890.....	22,576	820									
1891.....	22,749	22,777	68								
1892.....	22,749	22,801	23,274	7,753							
1893.....	22,793	22,781	22,762	22,749							
1894.....	22,813	22,789	22,858	22,813	12,567						
1895.....	22,891	22,922	22,913	22,936	13,629	9,571					
1896.....	23,178	30,906	23,232	23,183	20,735	21,051	13,572				
1897.....	22,750	23,202	30,912	23,185	20,745	25,370	21,119	14,382			
1898.....	23,646	23,178	23,184	23,199	20,842	21,080	21,080	20,851	21,318	7,569	
1899.....	23,178	23,205	22,477	30,135	20,082	20,926	20,956	17,448	18,285	14,669	7,628
Total.....	229,323	215,381	191,680	175,953	108,600	97,998	76,727	52,681	39,603	22,238	7,628

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.
WORKS AND YARDS OF L'ERMITAGE, ST. DENIS (SEINE), FRANCE.

TELEGRAPHIC ADDRESS: BELLEVILLE, SAINT DENIS, SUR SEINE.

TRADE NOTES.

The Ashton Valve Co., manufacturers of Ashton "pop" safety valves, pressure and vacuum gauges, No. 271 Franklin street, Boston, has issued a beautiful calendar containing a photogravure of a river scene with a little boy fishing in it. The picture is entitled "Please Bite."

Pneumatic mattresses are especially suited to steamships and yachts and are being adopted by vessel owners wherever the advantages of them are understood. The Pneumatic Mattress & Cushion Co. of Reading, Mass., are extensive manufacturers of this line of goods. Their circulars show endorsements from all parts of the country.

Mr. Y. Watanabe, architect in the Imperial Japanese navy, has contracted with the American Bridge Co. for the steel work for a foundry and a gun and mounting shop for the Kure arsenal. The American Bridge Co. is also furnishing steel work for the forge shop for the Kure arsenal, and has just secured an order to furnish to the Compagnie des Chemins de Fer de Porto Rico two 133-ft. spans for the Manati river bridge, Porto Rico.

For neat printing and clear illustrations the pamphlets gotten out by the United States Metallic Packing Co. of Philadelphia are certainly gems. Some of recent date may be had for the asking. This company makes an engineering specialty of packing valve stems and piston rods on steam engines, etc., for all pressures and temperatures of steam. Their output for the year 1899 was 12,365 packings and the total from the beginning of business is in the neighborhood of 140,000. A very large portion of this business is with ship builders and ship owners all over the United States.

James McKay & Co., well known Pittsburg manufacturers of chain, are about to begin the erection of a large works at McKees Rocks, near Pittsburg. The present works in Pittsburg are not of sufficient capacity to meet the firm's growing trade. The new works, of steel and brick, will contain sixty fires to manufacture chains of sizes from 3-16 to 1/2 in.; twenty fires to make machine-welded chains from 9-16 to 1 1/4 in., and twenty fires for hand-welded chain up to the largest sizes made, giving a total of 100 fires and giving employment to 250 men. Electricity will be used for operating all the machinery.

In their "Superior" engine, the Lake Shore Engine Works of Marquette have a gas engine that will very probably make a reputation on the great lakes during another season sufficient to find a market for it in all parts of the country. Although introduced only a short time ago, engines of this type are already in use for auxiliary purposes on several schooners of medium size, saving tow bills and helping in calm weather, and negotiations are under way for a large number of them for harbor delivery purposes and other uses. The manufacturers propose to urge the sale of them for use in tenders on large steamers and will undoubtedly be successful. The engine is built for heavy work and is not of the kind

THIS ILLUSTRATES OUR

Standard Wall Radial Drill

with which we are having
unprecedented success.



We are selling a large number of these machines and they are giving universal satisfaction. We make these drills in lengths of arm from 6 ft. to 15 ft., and equip them with hand wheel feed, lever feed, or automatic feed, as desired. Capacity of this drill is forty 1 1/2-in. holes drilled to a depth of 2 1/2 in. in three hours in cast iron. We recently installed eighteen of these drills in a large bridge shop after they had made a thorough test of three drills previously purchased by them.

Let us have your inquiries for this machine.

The Cleveland Punch and Shear Works Co.,
CLEVELAND, O., U. S. A.

that is stopped by weather. Another trial of it was made by government officials on Lake Superior in one of the fiercest of the late November storms, and Lieut. McLellan of the life saving service says it is "the best engine in a thousand."

The American School of Correspondence, Boston, Mass., is sending out a special money card to be used by engineers and others desiring to examine instruction papers and text books of the school. The card contains a place where a silver 25-cent piece may be inserted and securely sealed. The card contains, also, a place for name and address and text book wanted. It may be placed in an envelope and addressed to the school without any further trouble. Anyone wishing to examine any of the instruction papers of this school should send for one of these cards in order to send the money safely.

BROWN HOISTING MACHINERY CO.'S PLANT DESTROYED.

Fire destroyed the plant of the Brown Hoisting Machinery Co., Inc., Cleveland, this week. The plant will be rebuilt at once. In fact while the ruins were smoldering the men were at work clearing away the debris, and the company was consulting with contractors regarding the erection of the new buildings. The company makes the following statement:

"We do not care to make any statement in regard to the amount of insurance carried by the firm, owing to the work of the adjusters which is now going on. The loss is practically total and is fully covered by insurance. Expensive machinery is ruined by fire. Saving the office building preserved us from a much greater loss, and the preservation of the valuable pattern room was a stroke of good fortune which cannot be estimated in dollars. Patterns are of equivocal value. In themselves they are valueless, but in connection with plenty of orders for shipment all over the world the loss of them would be incalculable. We cannot tell whether the company will or will not rebuild in exactly the same manner as before. That is a question for the architects to determine."

U. S. Engineer Office, Detroit, Mich., Dec. 1, 1900. Sealed proposals will be received here until 12 o'clock noon, standard time, Jan. 3, 1901, and then publicly opened, for furnishing material and labor of all kinds necessary to construct and put in operation one large steel-hulled, self-propelling, sea-going hydraulic dredge, with all necessary appliances complete, including electric light plant, distilling and refrigerating machinery; or the dredge without outfit. Bidders to state time of delivery. Information furnished on application. Thos. H. Handbury, Major, Eng'rs. Dec. 27.

WANTED TO CHARTER.

For the towing season of 1901, a tug of about 200 H. P. which can be loaded with 50 tons of coal and will draw not over 10 ft. 6 in. Red Cliff Lumber Co., Duluth, Minn. Dec. 20, Jan. 3, 17.

FOUNDRY AND MACHINE SHOP FOR SALE.

To close an estate. Located in one of the large cities on the lakes. Long established, well equipped, doing good business, marine and general. Splendid chance for the right parties. Will sell plant or lease for a term of years. Address "Administrator," care Marine Review Pub. Co., Perry-Payne Bldg., Cleveland. tf.

TUG FOR SALE.

Good Tug, six years old. Engines 18x20. Boiler allowed 130 pounds steam pressure. Address Box 284, Ashland, Wis. Dec. 27

MECHANICAL ENGINEER

with twenty-four years' practical experience with all kinds of marine and stationary engines and boilers is now open for engagement as manager, superintendent, foreman or chief draftsman of works. Highest testimonials and references produced. Apply Box 425, The Marine Review Pub. Co., Perry-Payne Bldg., Cleveland. Dec. 20

PATROL BOAT WANTED.

The Ohio Fish & Game Commission wants to buy a boat suitable for police patrol on the waters of Lake Erie. Send description and price of boat to A. J. Hazlett, Commissioner, Bucyrus, O. Dec. 20.

WORTHINGTON PUMP FOR SALE CHEAP.

Size 17x22x15 in. In good condition. Address American Ship Building Co., Cleveland, O. Dec. 20

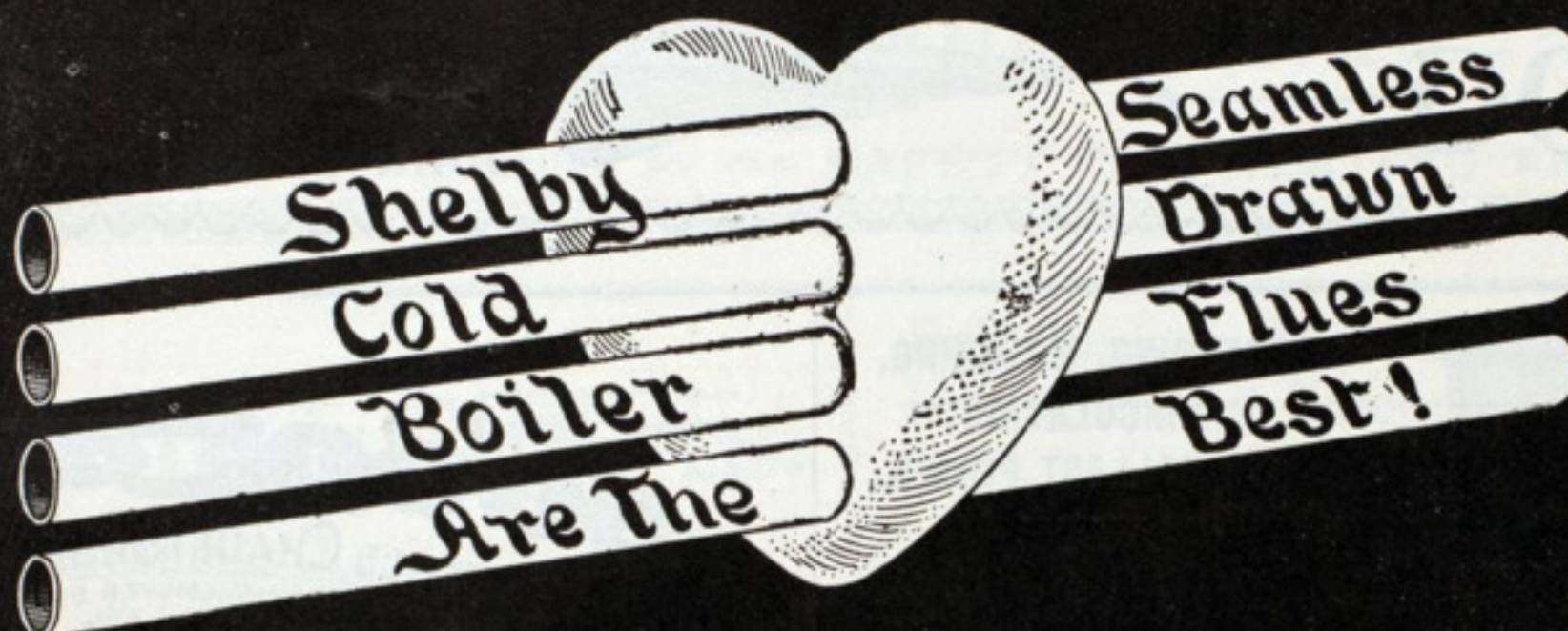
FIVE ELECTRIC PASSENGER LAUNCHES FOR SALE.

In fine condition. Length over all, 35 feet. Seating capacity, 28. Send for price list. Yacht brokers, please note. Milwaukee Electric Launch Co., 1504 Monadnock Block, Chicago. tf

WANTED TO PURCHASE, RENT OR CHARTER.

Tug and scows, capacity of the latter to be 1,000 to 1,500 tons. Steam-barge owners correspond. Stone to be transported from our pier at Stone Haven, 7 miles north of Port Washington, to Lake Michigan ports. Lake Shore Stone Co., Belgium, Ozaukee Co., Wis. tf

THE HEART OF ANY PLANT IS THE BOILER



THEY ARE FREE FROM
SEAMS AND ALL OTHER IMPERFECTIONS
VERY DENSE, TOUGH AND DUCTILE
TRUE TO GAUGE
DO NOT SPLIT, CRACK^{NOR} FAIL AT
THE ENDS. BEING PERFECTLY
SMOOTH, ^{THEY} DO NOT COLLECT SCALE!



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SHELBY STEEL TUBE CO. CLEVELAND O

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BRANCH OFFICES:

NEW YORK

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BURRELL & FOWLER - CLEV'D O.

Dearborn Vegetable Boiler Compounds.

SCIENTIFICALLY AND UNIFORMLY MADE. EVER RELIABLE.

Most Scientifically equipped, Complete, Handsome and expensively Furnished Laboratories, and the ONLY EXCLUSIVE LABORATORIES ON STEAM ECONOMY in the Country.

MARINE FORMULA NO. 5, For the WATERS of the FIVE LAKES.

To prevent pitting, neutralize the oil, stop incrustation, and as a perfect preservative to the iron, boiler, and all its connections—especially prepared for the marine trade of the lakes.

If you are using a different water, prepay the express on a gallon jug of your feed water to the DEARBORN LABORATORIES at CHICAGO and receive a copy of analysis of same, with a written diagnosis of your case, and a letter giving you all the valuable information we can, and the actual cost of what it will require to clean your boilers and keep them clean. All of this will be done free of charge, and optional with you whether you order or not. When in Chicago call and inspect our Laboratories.

Analyzers of Everything.

Makers of Boiler Compounds.

DEARBORN DRUG & CHEMICAL WORKS

W.M. H. EDGAR, President.

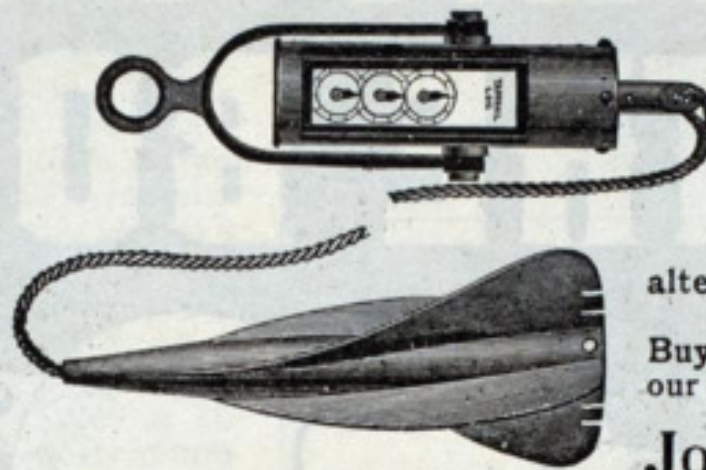
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CHICAGO

OFFICES: 29, 30, 31, 32 and 33 Rialto Building. Telephone, Harrison, 1373.

WORKS: 23, 25, 27 and 29 La Salle Street. Telephone No. 1130 South.

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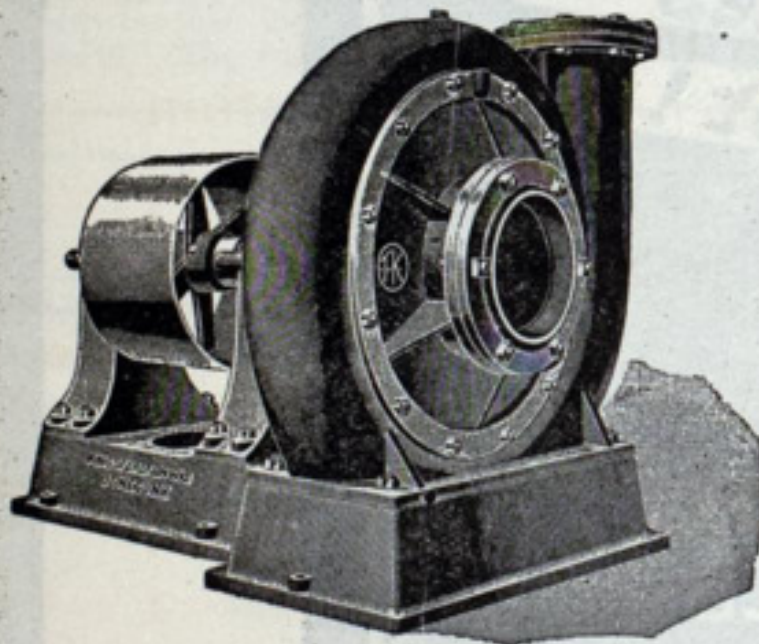


Over 11,000 Sold
A portion are now made to indicate Statute Miles for use on the Lakes.

Send us your old Bliss Register, and we will alter it to indicate statute miles for \$3.50.

There are poorly made imitations of our rotator. Buy only the Bliss Adjustable Rotator, stamped with our name and patents. For sale by Ship Chandlers.

John Bliss & Co., 128 Front Street, NEW YORK.



DREDGING, WRECKING,
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Marine Boilers.

KINGSFORD FOUNDRY
AND MACHINE WORKS,
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ALL CHAINS MANUFACTURED FROM
OUR OWN IRON.

CHAINS TESTED TO THE ADMIRALTY STANDARD
AND PROOF CERTIFICATES FURNISHED.
OUR TESTING MACHINE 300,000 LBS CAPACITY
IS LICENSED BY BRITISH LLOYD'S ASSOCIATION.

NEWHALL CHAIN FORGE AND IRON CO.
OFFICES, HAVEMEYER BUILDING
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MANUFACTURERS OF
HIGH CLASS YACHT & SHIP CABLES, HAND MADE CRANE,
QUARRY, MINING, RAFTING, TUGGLES, LOGS, HAULING AND
CONVEYOR CHAINS, HIGH GRADE BRAKE SPECIAL STEEL
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BRANDED "WARWICK" DREDGE AND STEAM SHOVEL CHAINS.

KEEP YOUR BOILERS CLEAN BY USING Clean Water

The "BUFFALO" is Warranted to Remove all Sediment and Scale Forming Substance.

Anyone Can Operate It.

IT ADDS YEARS TO THE
LIFE OF THE BOILER.

Used on principal steamers of Anchor Line, Lake Michigan & Lake Superior Transportation Co., American Steel & Wire Co., Bessemer Steamship Co., and others, aggregating 55,560 I. H. P.

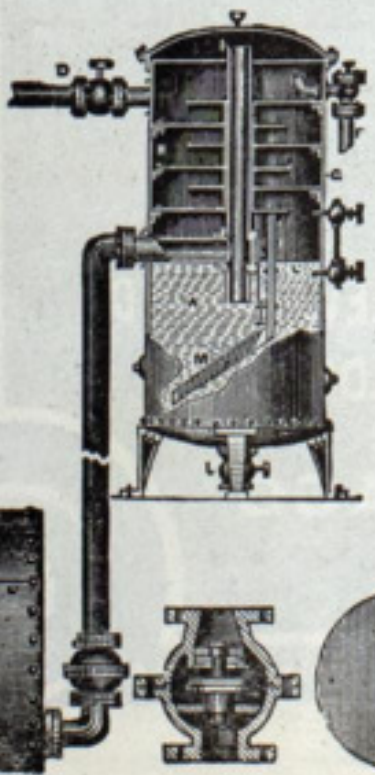
Ask For Catalogue.

ROBERT LEARMONTH, Patentee,

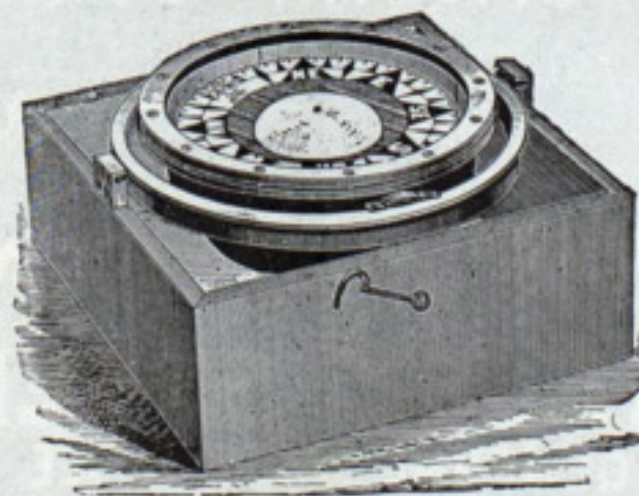
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BUFFALO, N. Y.

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FEED WATER
HEATER
AND PURIFIER.



Ritchie Liquid Compass



THE STANDARD LIQUID COMPASS.
USED EXCLUSIVELY BY THE UNITED
STATES NAVY FOR OVER
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OVER 25,000 USED IN MERCHANT
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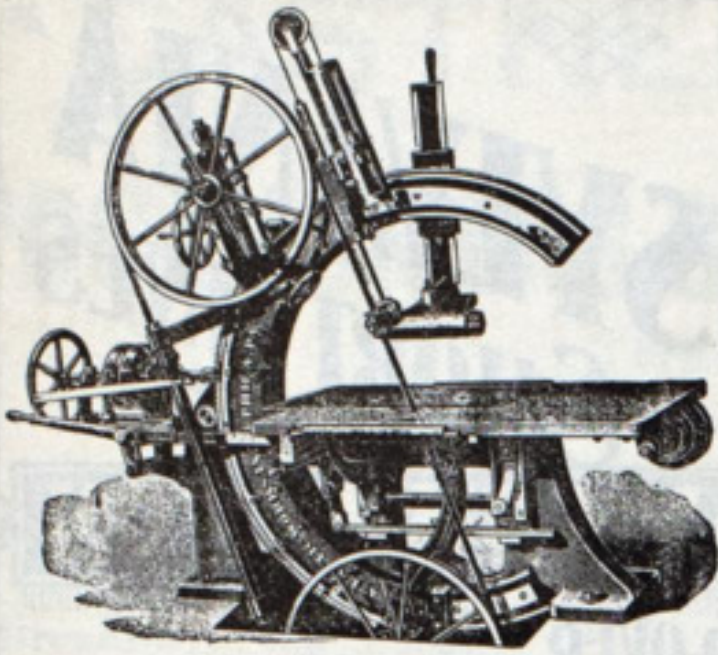
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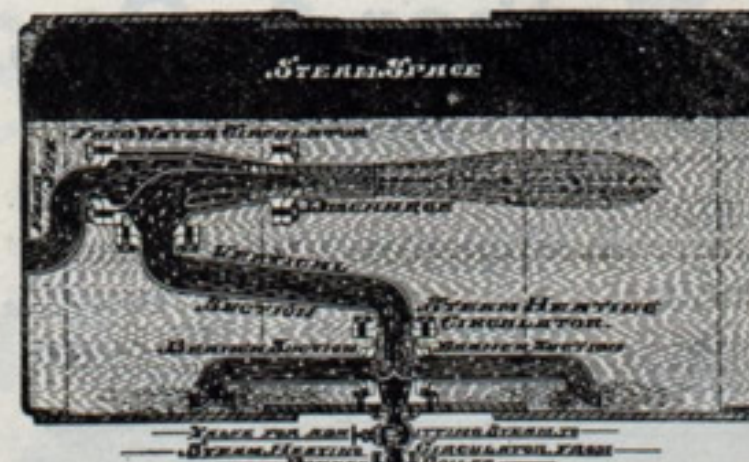
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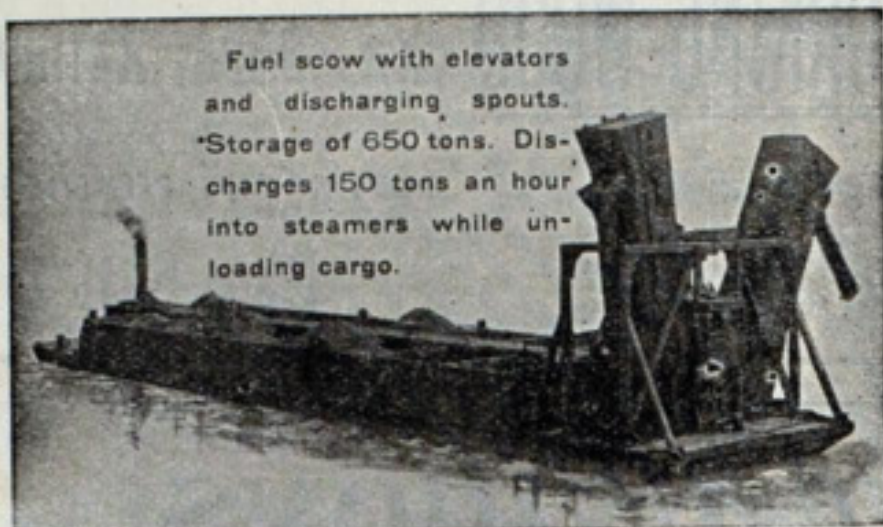
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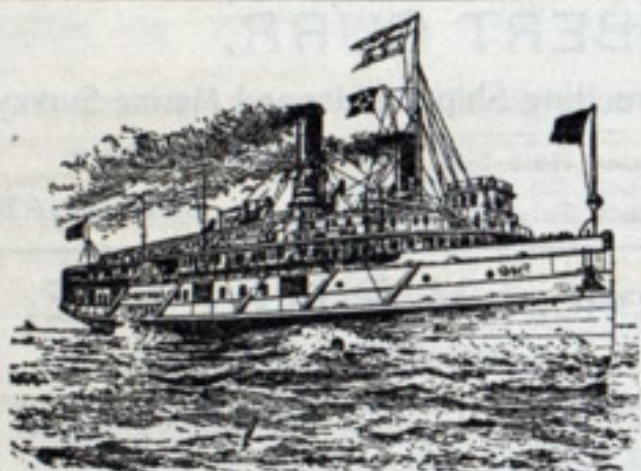
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 Harlan & Hollingsworth Co.....Wilmington, Del.
 Hodge, S. F. & Co.....Detroit.
 Jenks Ship Building Co.....Port Huron, Mich.
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 MacKinnon Mfg. Co.....Bay City, Mich.
 Maryland Steel Co.....Sparrow's Point, Md.
 Moran Bros. Co.....Seattle, Wash.
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 Sheriffs Mfg. Co.....Milwaukee.
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 General Electric Co.....Schenectady, N. Y.
 Rushmore Dynamo Works.....Jersey City, N. J.
 Westinghouse Electric & Mfg. Co.....Pittsburg.

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 Wood, R. D. & Co.....Philadelphia.
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 Niles Tool Works Co.....Hamilton, O.
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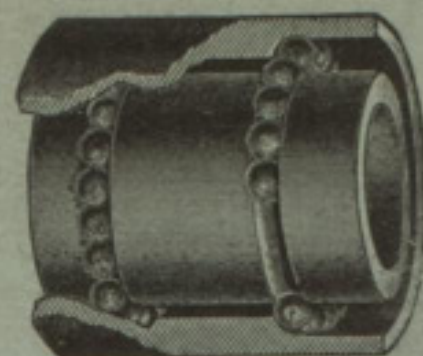
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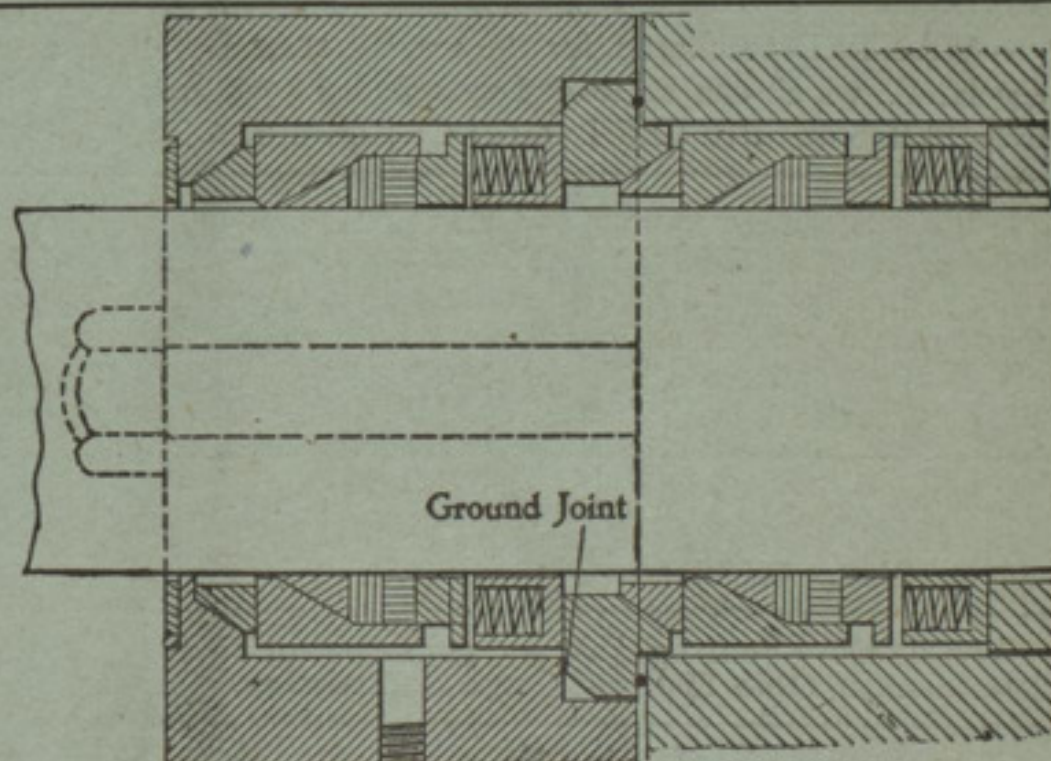
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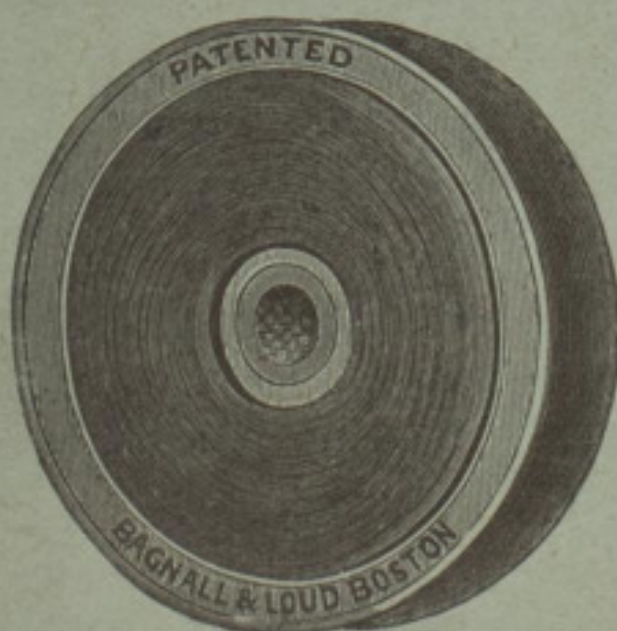


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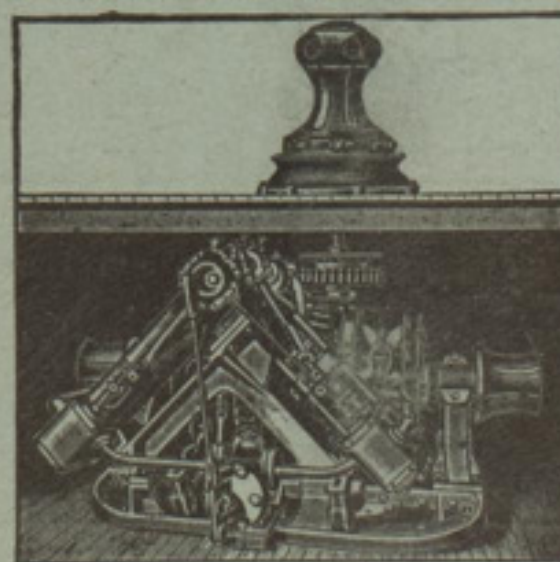
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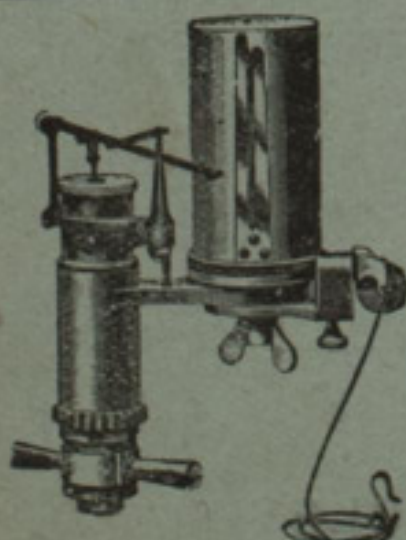
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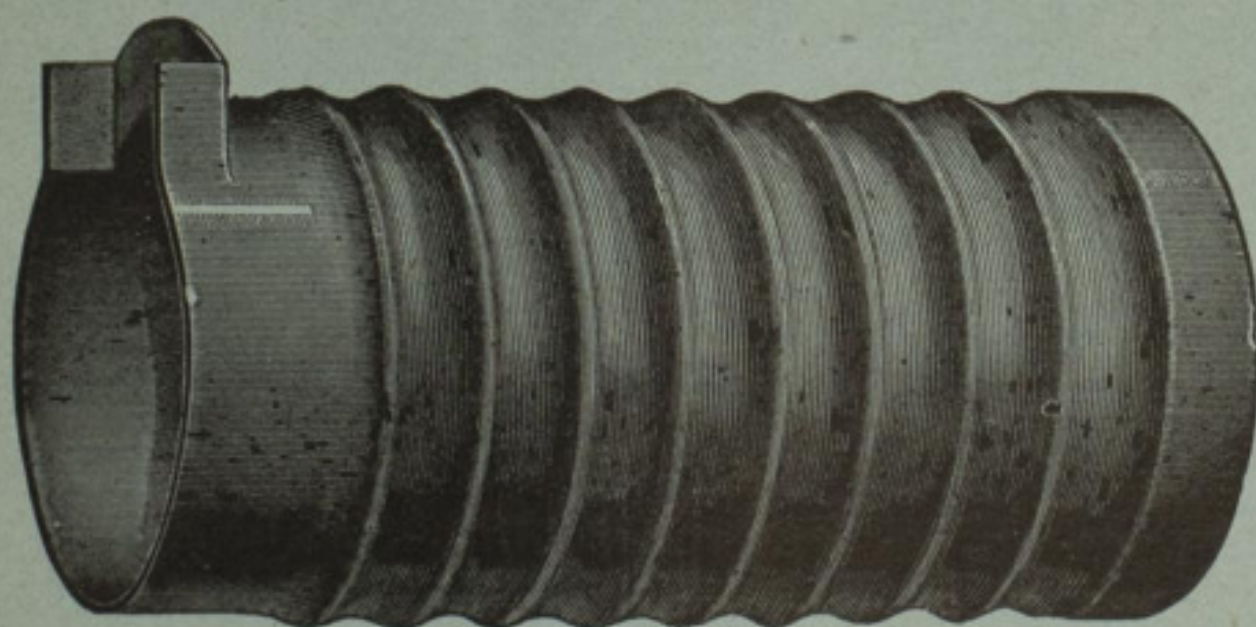
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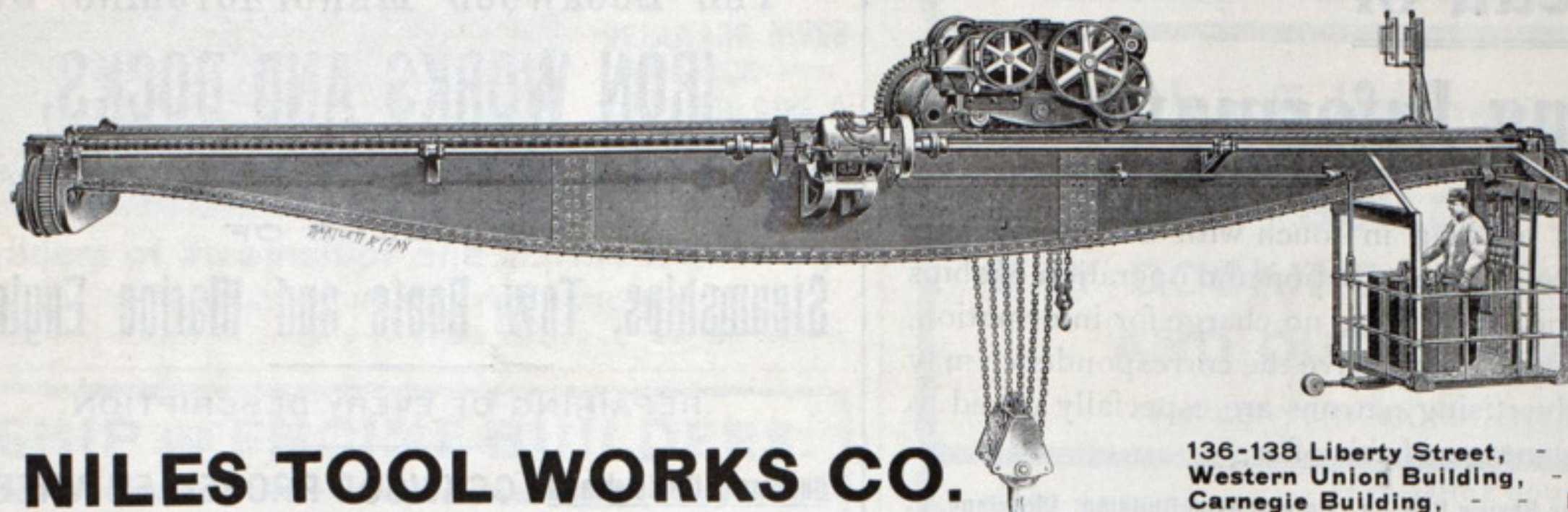
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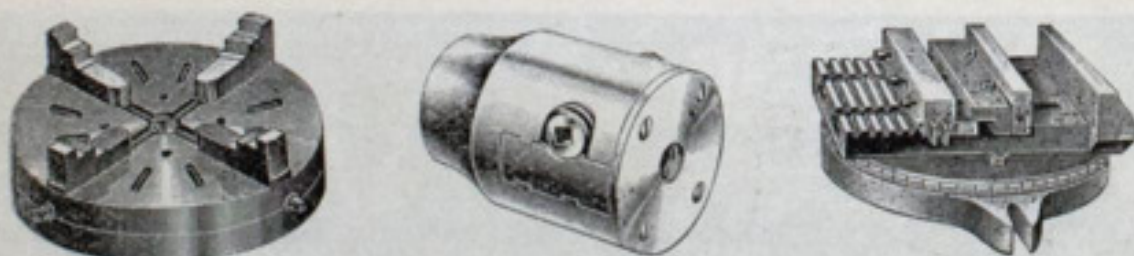
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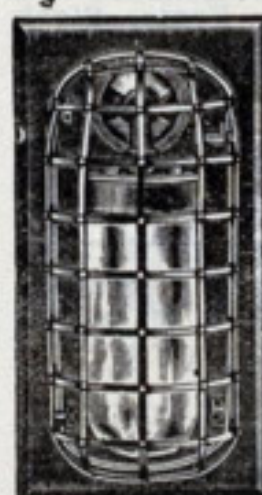
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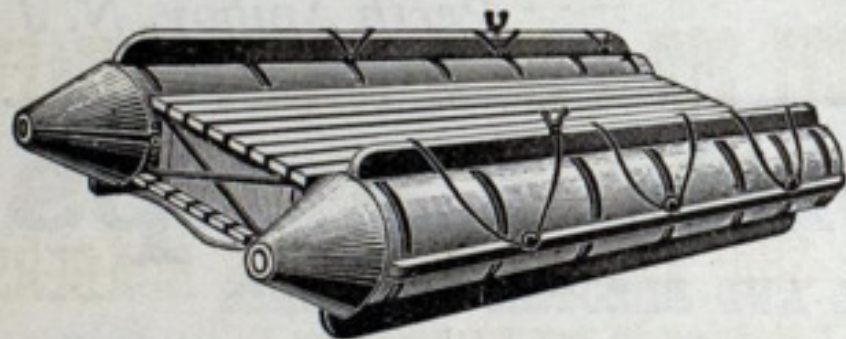


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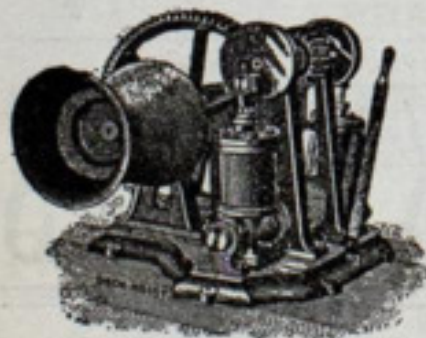


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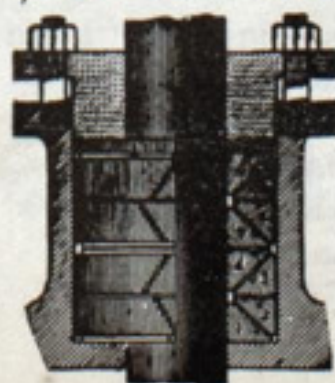
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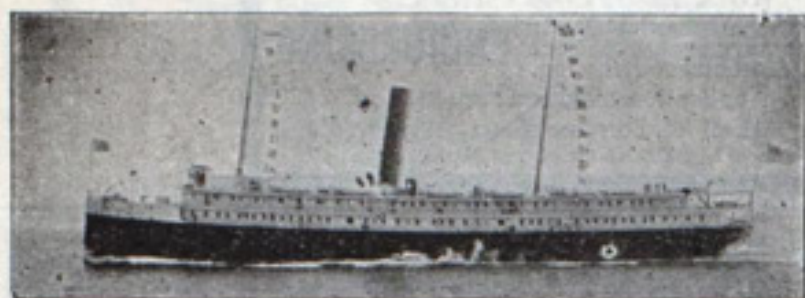
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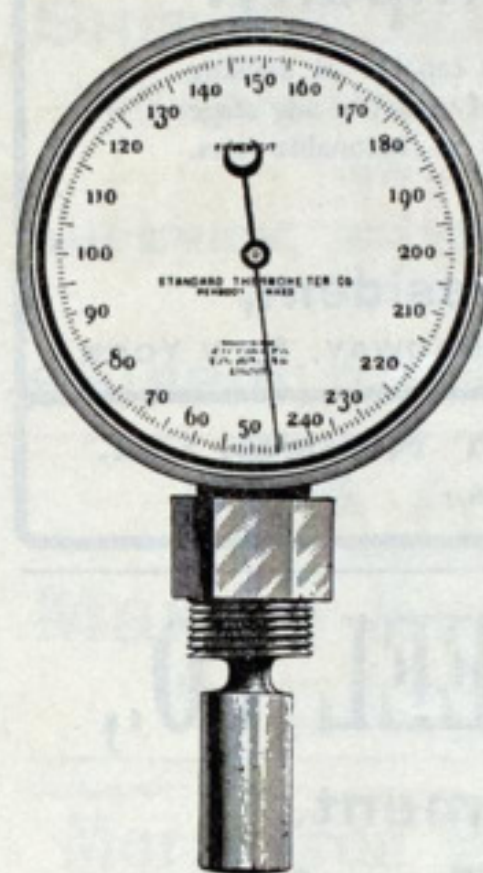
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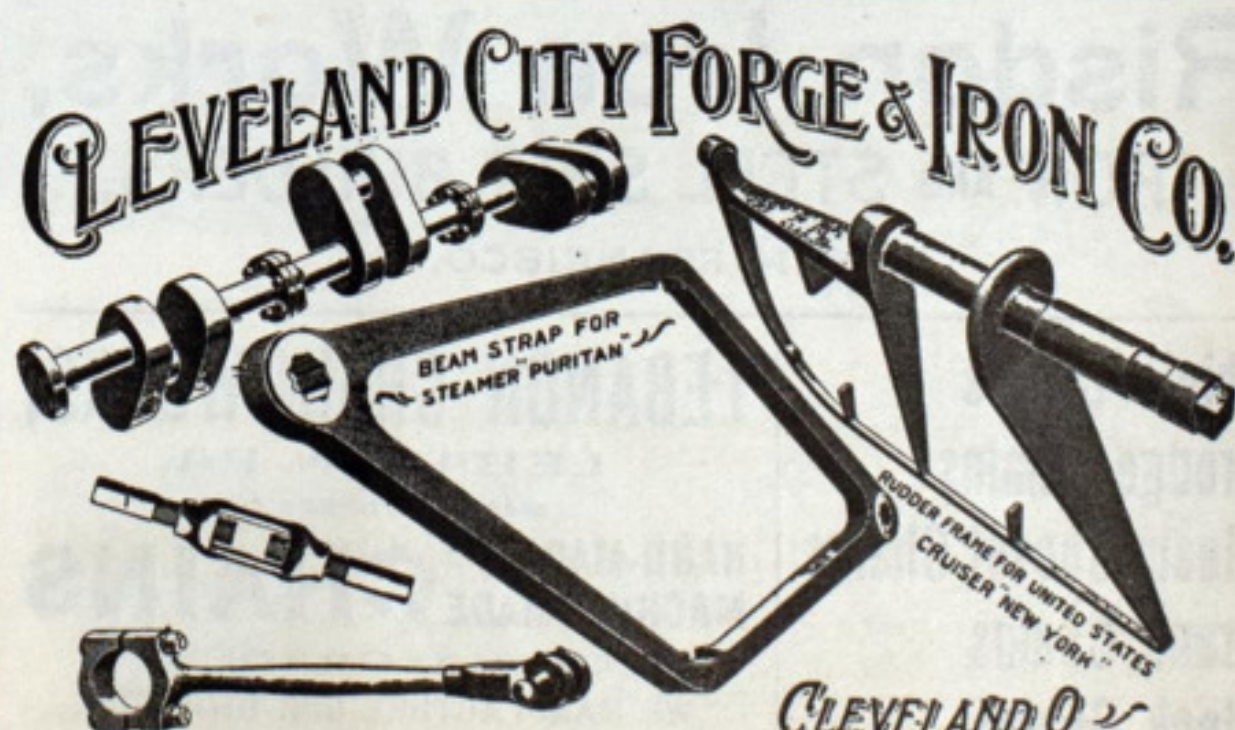
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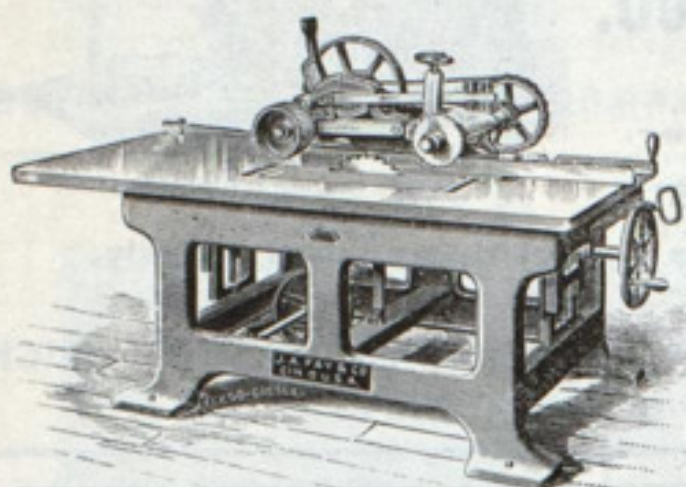
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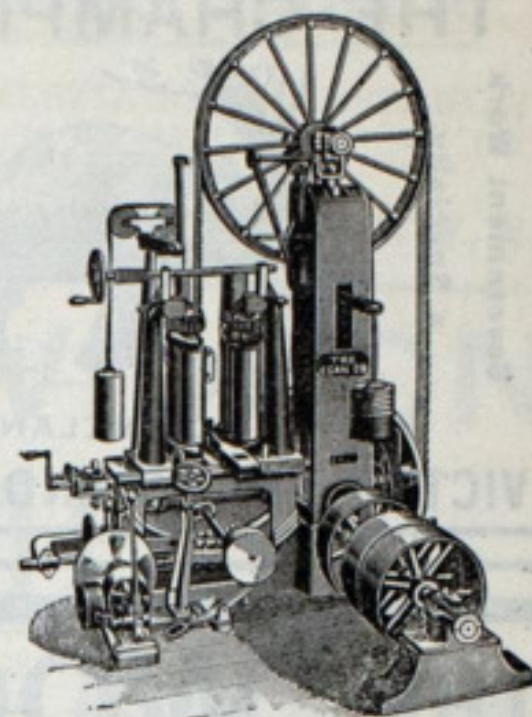
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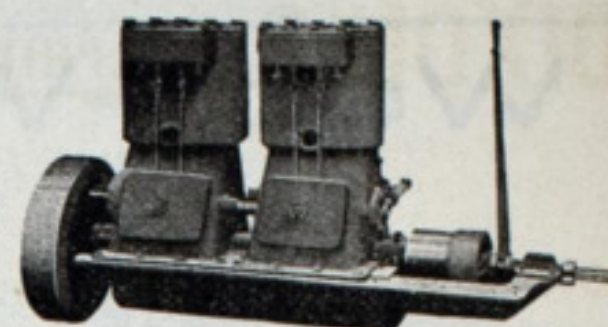
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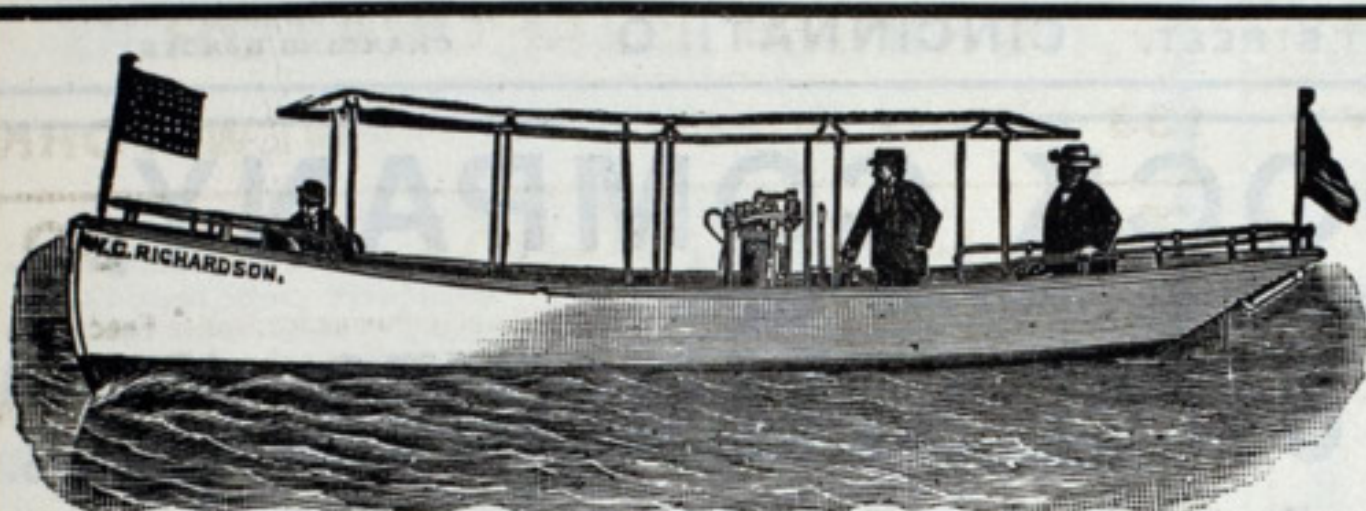
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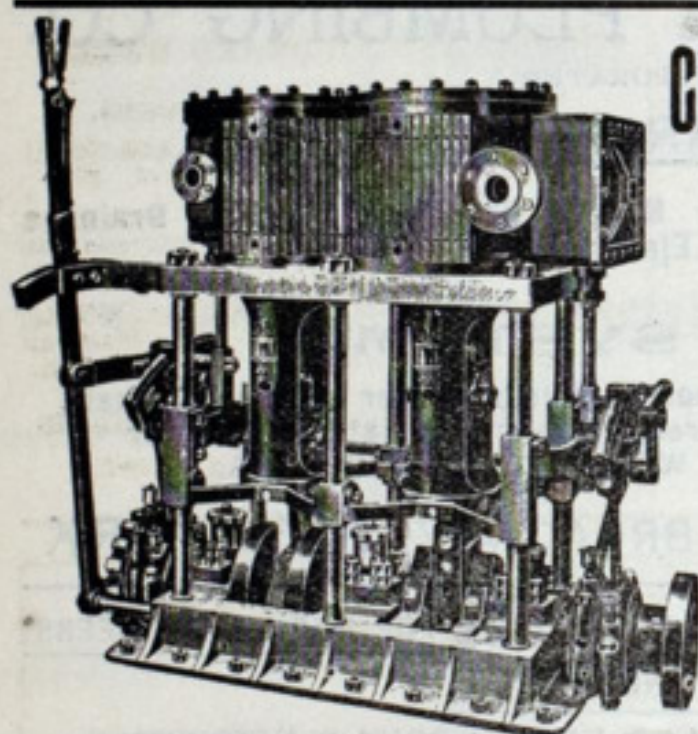
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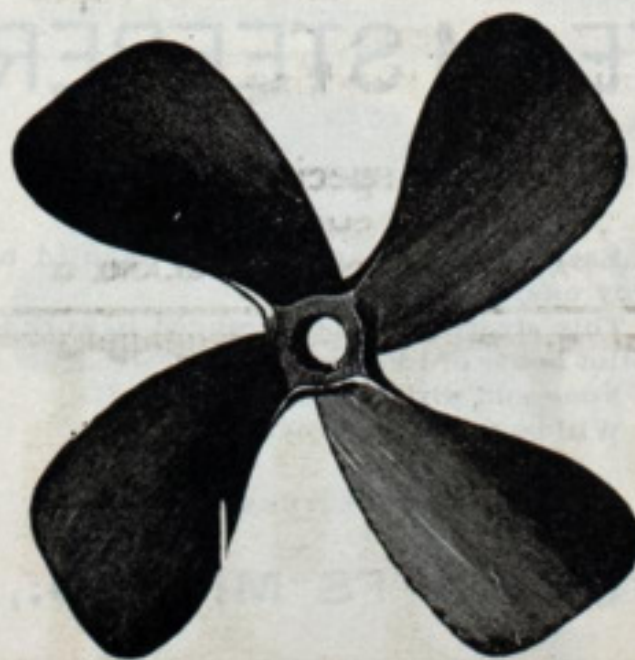
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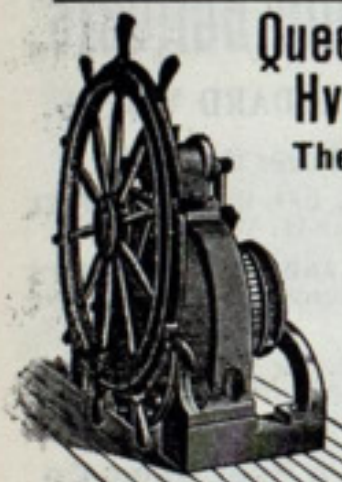
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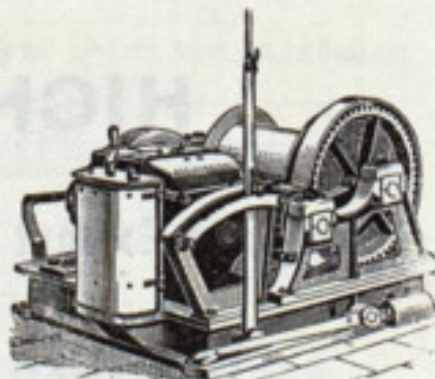
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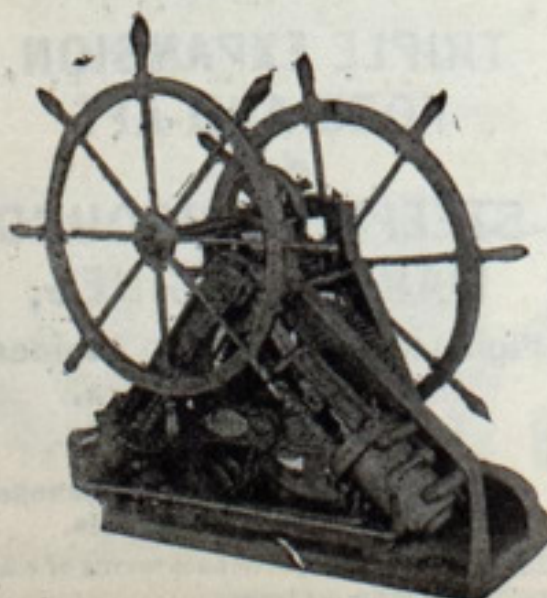
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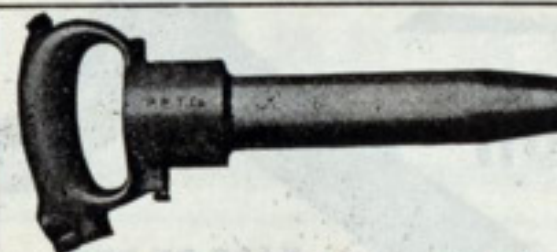
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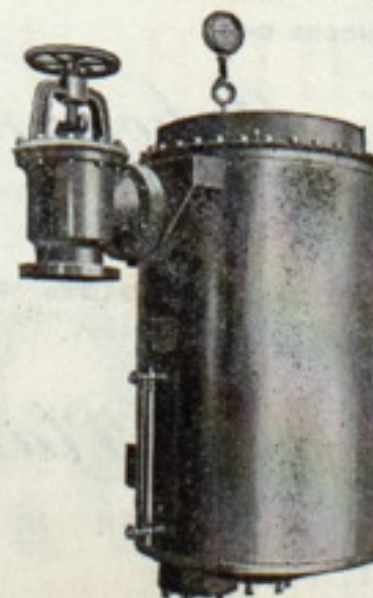


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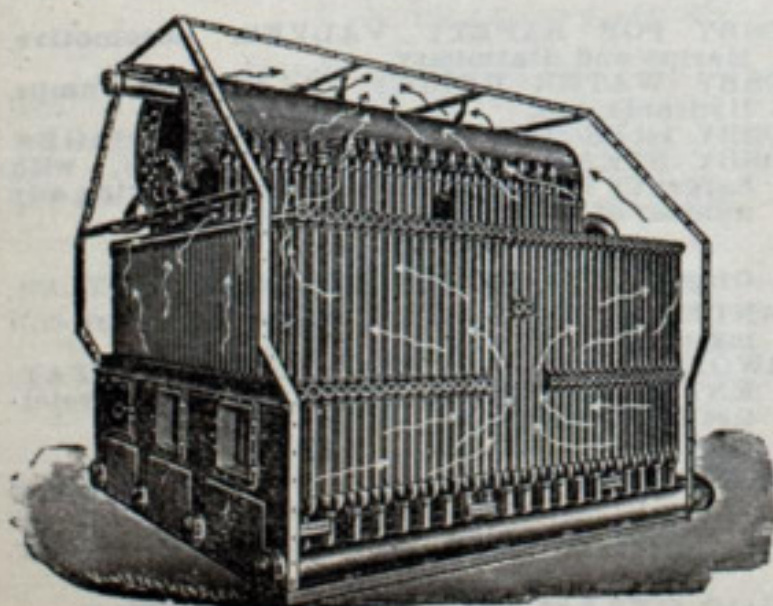
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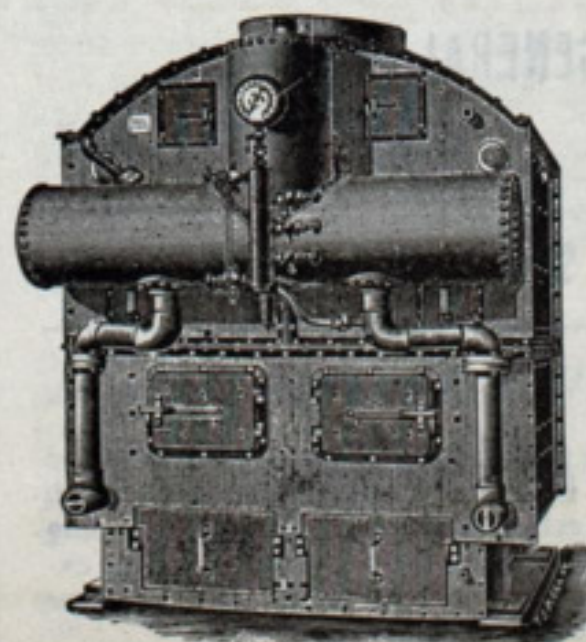
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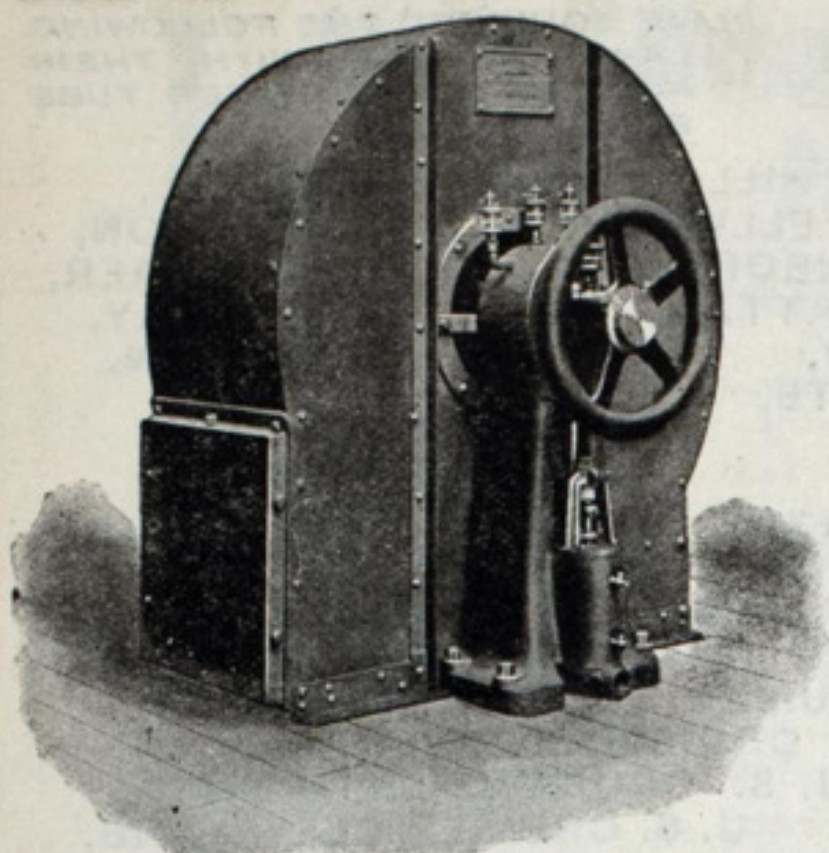
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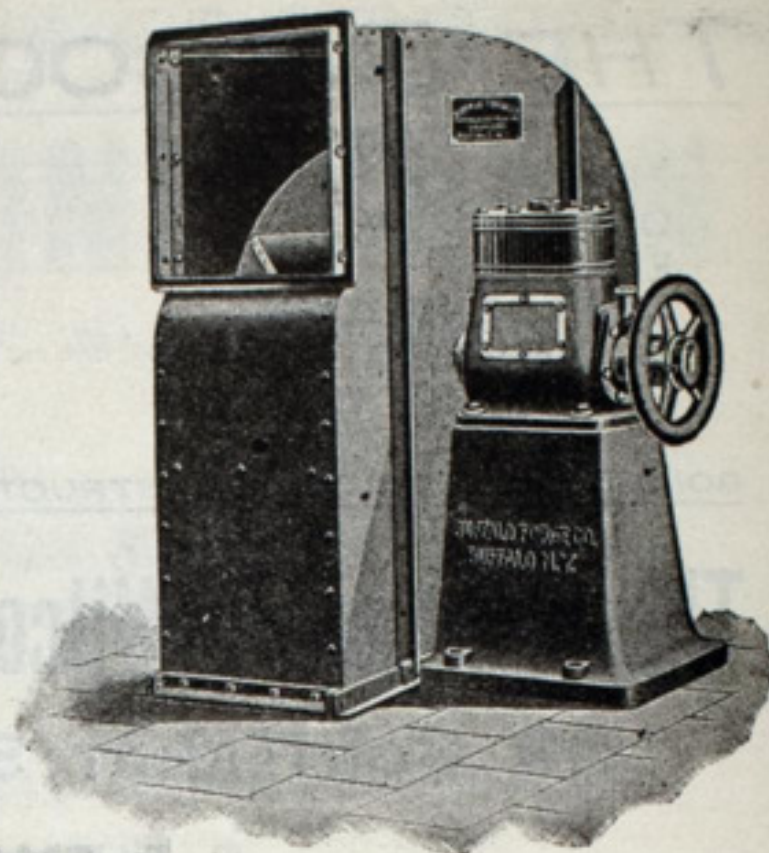
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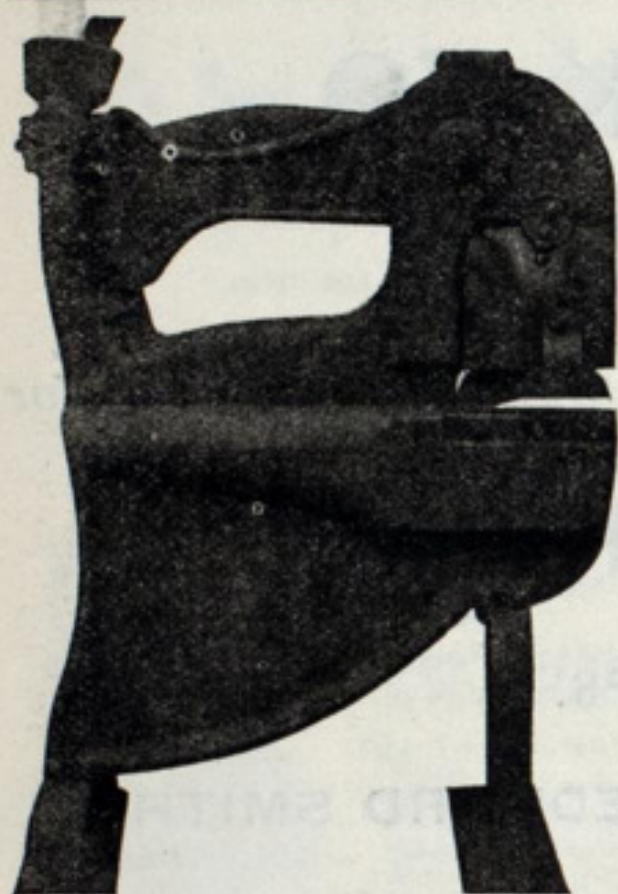
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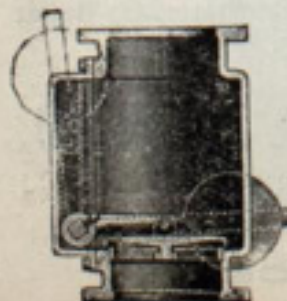


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